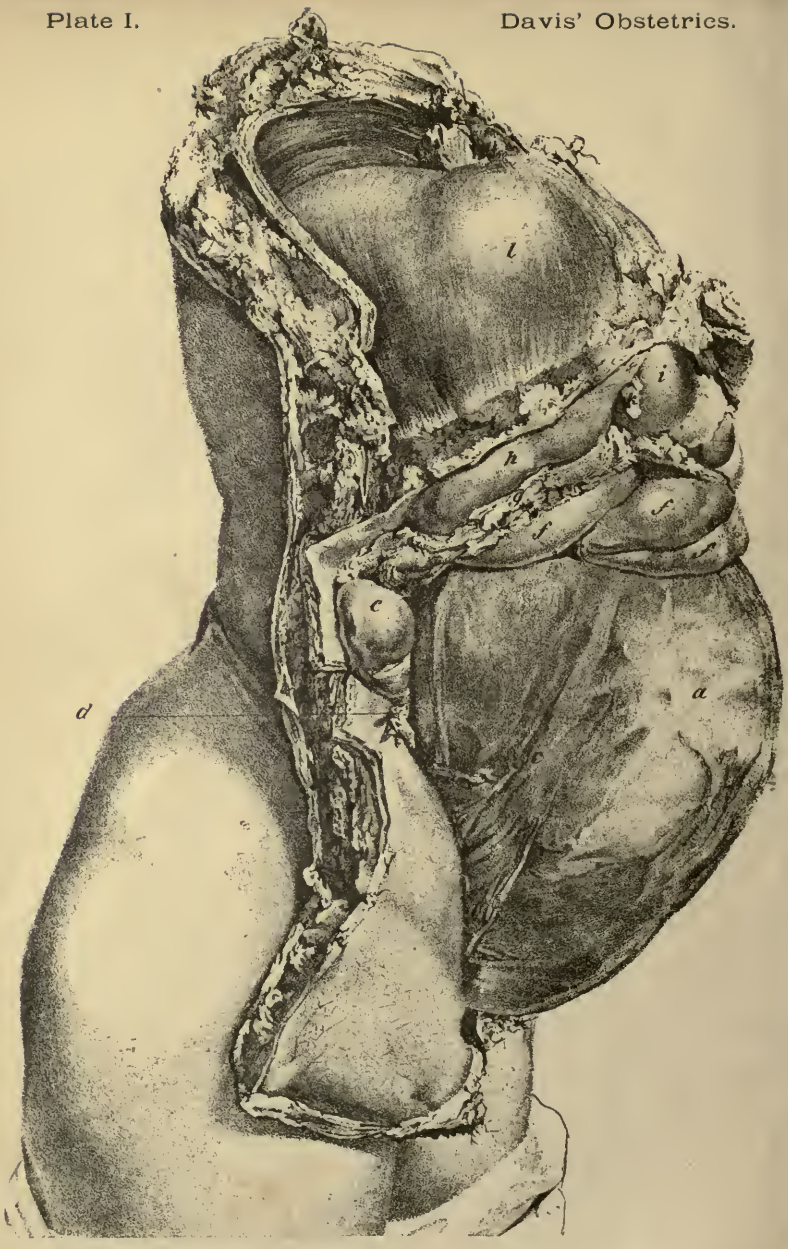
lifornia
ional
ility

BOUGHT OF
ANDERSON & DAHL,
MEDICAL BOOKSELLERS,
N W CORNER
CONGRESS & HONORE STS
CHICAGO.

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/manualofpractica00daviiala



The Abdomen at Term. (Martin.)

Side view of Abdominal Cavity laid open after partial removal of the large omentum in a woman far advanced in pregnancy (one-third life size). *a*, uterus at term; *b*, right round ligament; *c*, right oviduct; *d*, fimbriæ of the right oviduct; *e*, ascending colon; *fff*, coils of intestine; *g*, large intestine; *h*, right lobe of liver; *i*, left lobe of liver; *k*, round ligament of liver cut through; *l*, diaphragm covered with the pleura.

A MANUAL

OF

PRACTICAL OBSTETRICS.

BY

EDWARD P. DAVIS, A. M., M. D.,

CLINICAL LECTURER ON OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE, PROFESSOR OF OBSTETRICS AND DISEASES OF CHILDREN IN THE PHILADELPHIA POLYCLINIC, VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, PHYSICIAN TO THE CHILDREN'S DEPARTMENT OF THE HOWARD HOSPITAL, MEMBER OF THE AMERICAN GYNÆCOLOGICAL SOCIETY.

WITH ONE HUNDRED AND FORTY ILLUSTRATIONS, TWO OF WHICH ARE COLORED.

PHILADELPHIA:

P. BLAKISTON, SON & CO.

1012 WALNUT STREET.

1891.

WQ 100
D261m
1891

COPYRIGHT, 1891,
BY
P. BLAKISTON, SON & CO.

PREFACE.

THE preparation of this book has been suggested to me by the needs experienced in teaching students of medicine. The development of post-graduate instruction, and the establishment of obstetrics as a Senior Study in medical colleges, have relieved obstetric study from the details of anatomy and physiology memorized by the student in his earlier years. Whether he be an undergraduate in a medical college, or a practitioner, he desires to know the reasons for scientific facts, and the practical deductions which their consideration suggests. As an aid in such study, I have endeavored to give a concise statement of modern practical obstetrics as taught by Parvin, Lusk, Schröder, Winckel, Carl Braun, Galabin and Dührssen. Personal experience has guided my choice of methods of treatment commended. My best thanks are due to Professor Parvin for many acts of courtesy and kindness; to Dr. Naudain Duer for assistance in preparing illustrations; and to Dr. A. A. Eshner for the index.

250 S. 21st Street,
Philadelphia.

TABLE OF CONTENTS.

CHAPTER.		PAGE.
I.	Ovulation; Menstruation; Conception; the Ovum	9
II.	The Embryo	15
III.	The Fœtus and its Physiology	24
IV.	The Birth Canal	34
V.	The Mother in Pregnancy	43
VI.	The Diagnosis of Pregnancy	45
VII.	The Hygiene of Pregnancy	53
VIII.	The Attitude and Location of the Fœtus	57
IX.	Labor, the Head Presenting	61
X.	Abnormalities of Labor, the Head Presenting	71
XI.	The Treatment of Normal Labor	77
XII.	The Third Stage of Labor	83
XIII.	The Treatment of Abnormal Labors, the Head Presenting	88
XIV.	The Forceps	91
XV.	Axis Traction; the Rarer Uses of the Forceps	98
XVI.	Labor in Breech Presentations	109
XVII.	Labor in Transverse Positions	120
XVIII.	Version	123
XIX.	Labor when the Child and Birth Canal of the Mother are Disproportionate in Size	132
XX.	Labor Complicated by Obstruction in the Birth Canal	135

CHAPTER.		PAGE.
XXI.	Labor in Contracted Pelves	139
XXII.	Abortion; Premature Labor	149
XXIII.	Induced Labor	157
XXIV.	Multiple Pregnancy	161
XXV.	Pathology of Pregnancy: Eclampsia	166
XXVI.	The Acute Infections Occurring During Pregnancy	175
XXVII.	Affections of the Genito Urinary Organs Occurring During Pregnancy. The Blood and Nervous System	179
XXVIII.	The Surgical Treatment of Complicated Labor	188
XXIX.	Embryotomy	194
XXX.	The Puerperal State	206
XXXI.	Puerperal State; Lactation	212
XXXII.	Artificial Feeding of Infants	217
XXXIII.	Abnormal Insertion of Placenta: Placenta Prævia	222
XXXIV.	Ectopic Pregnancy	228
XXXV.	Post Partum Hæmorrhage	233
XXXVI.	Accidents of Labor Endangering the Mother	238
XXXVII.	Laceration of Perineum and Pelvic Floor	245
XXXVIII.	Puerperal Sepsis	251
XXXIX.	The Treatment of Puerperal Sepsis	258
XL.	Complications of the Puerperal State	261
XLI.	Retention of the Placenta	266
XLII.	Disease of Fœtal Appendages	269
XLIII.	Disorders of the Fœtus	273
XLIV.	Monsters	277
XLV.	Diseases of Newborn Child	279
	Appendix	284
	Index	291

LIST OF ILLUSTRATIONS.

1.—Two Graafian Follicles.
2.—Human Ovum.
3.—The Muriform Body.
4.—The Deciduous Membranes.
5.—The Embryonic Area and Axial Groove.
6.—Embryo, Seven or Eight Weeks Old.
7.—Ovum Six Weeks Old.
8.—The Amnion and Allantois.
9.—Villi of Chorion (low power).
10.—Villi (330 diameters).
11.—Placental Villi and Decidua.
12.—Placenta, Membranes (stripped upward).
13.—Placental and Uterine Vessels.
14.—The Placenta and Uterus (injected while adherent).
15.—The Membranes. (Section through uterine wall.)
16.—Cross Section of Cord.
17.—Diagram of the Fœtal Circulation.
18.—The Fœtal Head.
19.—The Fœtal Head.
20.—The Fœtal Head.
21.—The Birth Canal.
22.—Diameters of Pelvic Brim.
23.—Pelvic Outlet.
24. Diameter of Brim, and Axis of Birth Canal.
25.—Axis of Fœtal Body, Fulcrum, Short and Long Arm of Lever.
26.—The Pelvic Measurements.
27.—Internal Measurements of the Antero-Posterior Diameter of the Pelvic Brim.
28.—The Pelvimeter.
29.—The Usual Attitude and Location of the Fœtus.
30.—Lateral Surface of the Pelvis.
31.—The Fœtus in a Primagravida.
32.—The Fœtus in a Multigravida.
33.—The Descent of the Fœtus in Left Occipito Anterior Labor.
34.—The Head Engaging in the Pelvic Brim.

35.—Descent and Rotation.
36.—The Head upon the Pelvic Floor.
37.—Beginning Expulsion of the Head.
38.—Retrocession of Coccyx.
39.—Head Born in Right Occipito-Anterior Labor.
40.—The Occiput in the Hollow of the Sacrum.
41.—Face Presentation; Left-Fronto-Anterior.
42.—Right-Fronto-Anterior.
43.—Mechanism of Face Presentation.
44.—Expulsion of the Head in Face Presentation.
45.—Head Born in Face Presentation.
46.—Episiotomy.
47.—Episiotomy Knife Devised by the Writer.
48.—The Placenta and Membranes, after the Expulsion of the Fœtus.
49.—The Abdomen after the Fœtus is Born, The Placenta in the Uterus.
50.—The Expulsion of the Placenta, Fœtal Surface First.
51.—The Placenta in the Lower Uterine Segment.
52.—Davis Forceps, Perforated for Axis Traction Tapes.
53.—The Left Hand Grasping the Left Forceps Blade.
54.—The Introduction of the Left Blade Completed.
55.—Protection of the Perineum in Forceps Delivery, the Patient upon the Left Side.
56.—Axis Traction.
57.—Lusk's Tarnier's Axis-Traction Forceps.
58.—Tarnier's Latest Axis-Traction Forceps.
59.—Simpson's Axis-Traction Forceps.
60.—Simpson's Forceps, with Poullet Tape Attachment for Axis-Traction.
61.—Breech Presentation, The Legs Extended. (First position.)
62.—Descent of the Trunk, Breech Presentation. (Second position.)
63.—The Shoulders Emerging, Breech Presentation. (Second position.)
64.—Expulsion of the Head in Breech Cases.
65.—Head Born in Breech Labor.
66.—Bringing down the Hips in a Delayed Breech Labor.
67.—Bringing down the Trunk in Breech Cases.
68.—The Arms beside the Head.
69.—The Arms beside the Head.
70.—Delivering the Arms.
71.—The Delivery of the After-coming Head. (A.)
71.—Attempted Spontaneous Evolution in Transverse Position. (B.)
72.—Right Dorso-Anterior.
73.—Right Dorso-Posterior.
74.—Combined Version, (First stage).

75.—Combined Version, (Second stage).
76.—Combined Version, (Third stage).
77.—Internal Version, (Grasping the lower foot).
78.—Internal Version, (Grasping the upper foot).
79.—Internal Version, (Grasping both feet).
80.—The Noose in Version.
81.—The Obstetrician Anæsthetizing the Patient and Performing Version without Assistance.
82.—Symmetrically Small (Justo-Minor) Pelvis.
83.—The Posture and Abdominal Protrusion in a well-formed Pregnant Woman.
84.—Posterior Surface of a well-formed Female Body.
85.—Head Entering a Flat Pelvis.
86.—Flat Pelvis, the Head Passing through after Version.
87.—Flat Rhachitic Pelvis.
88.—Flat Rhachitic Pelvis.
89.—Attitude and Abdominal Protrusion (Pendulous Abdomen) of Woman with Rhachitic Pelvis.
90.—Spondylolisthetic Pelvis.
91.—Obliquely Contracted Pelvis following Fracture.
92.—Ovum of Two Months intact.
93.—Same Ovum, the Deciduous Membranes Opened showing Villi of Chorion.
94.—Smellie's Scissors.
95.—Blot's Perforator.
96.—Lusk's Cephalotribe.
97.—Martin's Straight Trephine.
98.—Fœtal Head Trephined and Delivered by Cranioclast.
99.—Grasping the Head with the Cranioclast.
100.—Braun's Cranioclast.
101.—Craniotomy with the Simple Perforator.
102.—Craniotomy with the Trephine.
103.—Decapitation; Tightening a Cord around the Neck.
104.—Braun's Decapitation Hook.
105.—Decapitation with Braun's Hook.
106.—Tarnier's Basiotribe.
107.—Placenta Prævia Centralis, Introducing the Hand to bring down the Feet.
108.—Combined Version, (Pushing up the Head).
109.—Combined Version, (Bringing down the Legs).
110.—Tubal Pregnancy.
111.—Tamponing the Uterus for Hæmorrhage.
112.—Threatened Uterine Rupture.
113.—Version in Threatened Rupture of the Uterus.
114.—Inversion of the Uterus.

115.—Methods of Closing Laceration of the Perineum.
116.—Methods of Closing Laceration of the Perineum.
117.—Methods of Closing Laceration of the Perineum.
118.—Methods of Closing Laceration of the Perineum.
119.—Methods of Closing Laceration of the Perineum.
120.—Methods of Closing Laceration of the Perineum.
121.—Methods of Closing Laceration of the Perineum.
122.—Methods of Closing Laceration of the Perineum.
123.—Hard Rubber Intra-Uterine Douche Tube.
124.—Replacing the Cord with a Catheter.
125.—Labor Delayed by Hydrocephalic Head.
126.—Hydrocephalus and Breech Presentation.
127.—Anencephalic Monster.
128.—Fœtal Bone, Syphilis, (Showing Syphilitic lines).

LIST OF PLATES.

PAGE

I. The Abdomen at Term (*Martin*) . . . . . Frontispiece
II. Supplementary Diagnosis of the Course of Labor from the Shape of the Skull of the New Born Child (*Olshausen*) . . . . . .
III. Flat Rhachitic Pelvis (*Martin*). . . . . .
IV. Normal and Contracted Pelves (*Martin*) . . . . . .
V. Rhachitic, Anchylosed, Osteomalacic and Contracted Pelves (*Martin*) . . . . . .
VI. Uterus with Twins in Cranial and Breech Presentation (*Smellie*) . . . . . .
VII. Flexions and Retroversions of Uterus I (*Martin*) . . . .
VIII. Flexions and Retroversions of Uterus II (*Martin*) . . . .
IX. Narrowing of the Vagina by an Ovarian Tumor (*Martin*) Colored . . . . . .
X. Transverse Rupture of the Anterior Cervical Wall (*Spiegelberg*) Colored . . . . . .
XI. Seat of Placenta over Os Uteri, from body of a Woman who had died of Uterine Hæmorrhage in the Ninth Month of Pregnancy, Placenta Prævia Centralis (*Martin*) . . . . . .

MANUAL OF PRACTICAL OBSTETRICS.

CHAPTER I.

OVULATION; MENSTRUATION; CONCEPTION; THE OVUM.

By Ovulation is understood the formation in the ovaries and discharge from those organs of the ova or eggs, from which the human being, in common with other mammals, is produced. This process does not occur at regular intervals, but goes on almost constantly from the establishment of puberty to the menopause and even later. Menstruation is a discharge of blood and epithelial elements from the uterine decidua which occurs at intervals, usually twenty-eight days each, but frequently is intermitted.

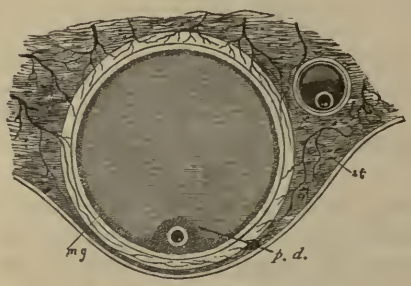
The relation between ovulation and menstruation may be expressed by the statement that a woman may ovulate without menstruation, but she will rarely menstruate without ovulation.

The discharge of blood occurring after removal of the ovaries or operations upon the pelvic organs is not menstruation, but uterine hemorrhage, as it is not caused by the exfoliation of the endometrium, and does not contain the cellular elements of the menstrual fluid.

Pregnancy causes menstruation to cease, as may also any cause which disturbs the general health, while ovulation may continue and a second conception occur prior to the formation of the decidual membrane in the first fecundated ovum; conception also takes place during the temporary cessations of menstruation which follow change of climate or great alteration in a patient's environment. Conception is the union of the male and female elements,

the joining of the spermatozoid of the male semen with the female ovum. When the woman's body contains this united element she is pregnant. To understand this condition known as pregnancy the anatomy of the ovum, the manner of its discharge from the ovary, and the site and mode of impregnation must be considered (Fig. 1).

Fig. 1.



Two Graafian Follicles.

m. g. Membrana granulosa. *s. t.* Ovarian stroma. *p. d.* Proligerous disc.

The ovaries contain the ova in ovisacs, called from their discoverer Graafian follicles. The capsule of a follicle is lined by round nucleated cells named the granular membrane (Membrana Granulosa). At some portion of the wall of the follicle these cells accumulate, forming the proligerous disc in which is found the ovum. This little body, $\frac{1}{120}$ of an inch in diameter, is composed of a yelk membrane (the vitelline membrane), a yelk (the vitellus), a transparent vesicle (the germinal vesicle), in the centre of which is the germinal spot; the germinal vesicle measures $\frac{1}{700}$ of an inch in diameter; the germinal spot $\frac{1}{3000}$, about the size of a red blood corpuscle (Fig. 2).

Fig. 2.

Human Ovum.

1. Germinal vesicle.
2. Yelk.

The ova are discharged from the ovaries by rupture of the ovisacs, and pass thence through the oviducts to the uterus; or, meeting the spermatozoids, may remain and develop in some portion of the duct of the ovary. These ducts,

called the Fallopian tubes, are sufficiently large to permit the passage of ova, spermatozoids and the secretion of the membrane lining the ducts. They terminate at the upper corners of the uterus, passing obliquely through the muscular wall to open upon the endometrium. At their ovarian extremities they expand into the pavilions, slightly concave dilatations lined with ciliated mucous membrane; the margins of the pavilions are fissured by irregular fringe-like projections called fimbriæ; one of these is attached to the ovary, forming the tubo-ovarian ligament, and anchoring the tube to the ovary. The oviducts or Fallopian tubes are four or five inches long; from $\frac{1}{6}$ to $\frac{1}{4}$ inch in diameter, and are composed of a peritoneal, muscular and mucous coat, the last having epithelium whose ciliæ move from the ovary toward the uterus. This mucous membrane is capable of nourishing by its secretion an impregnated ovum in its first days of life.

The male element essential to reproduction is the spermatozoid, an albuminous cell from $\frac{1}{300}$ to $\frac{1}{325}$ of an inch in length, consisting of a head, tail and intermediate segment. Spermatozoids are endowed with motion sufficiently rapid to enable them to pass from the vagina to the oviducts in a few moments. Their vitality persists when in alkaline media for 24 or 30 hours; they are rendered motionless by cold and killed by acids.

Impregnation, the joining of ovum and spermatozoid, may occur in any portion of the genital tract from the uterus to the ovary. It probably happens most frequently at the pavilion of the oviduct; when the impregnated ovum lodges in the uterus it is an entopic, intra-uterine, normal pregnancy; when the impregnated ovum is retained outside the cavity of the uterus, it is an extra-uterine or ectopic pregnancy, which is abnormal. It should be remembered that the genital tract, from the cervix uteri to the pavilion of the oviduct, is essentially one musculo-membranous tube whose epithelial lining membrane, in any portion of its extent, may receive and nourish the impregnated ovum in the early stages of its development, and whose muscular tissue finally expels the ovum at maturity. In normal pregnancy the fecundated ovum is soon passed onward into the uterus, whose muscular walls are es-

pecially fitted to expel a body of considerable size, like a fœtus at term, and overcome a marked resistance.

It will be necessary next to consider the changes which occur in the ovum after fecundation, and also the accompanying modifications in the genital tract and in the general organism of the mother during the growth of the ovum to maturity.

Before the contact of the spermatozoid, the germinal vesicle of the ovum moves towards the periphery and from the vesicle projects one or more cells or globules, called polar globules, whose function in the production of the new being is unknown. The portion of the germinal vesicle remaining after the formation of the polar cells is known as the female pronucleus. The spermatozoid penetrating the yelk or vitellus, loses its tail and intermediate portion, and the head forms the male pronucleus. After the entrance of one spermatozoid others are excluded by the formation of the vitelline or yelk membrane, thus rendering the production of monsters in normal cases impossible, by preventing the joining of more than one spermatozoid with the ovum.

Both male and female pronuclei approach each other, joining in a nucleus, and segmentation or cleavage occurs. This begins in the nucleus which has been formed by the union of the ovum and spermatozoid; the yelk, or vitelline mass which surrounds it, shares in the process, so that a portion of the yelk accompanies each of the first two nuclei formed by the division.

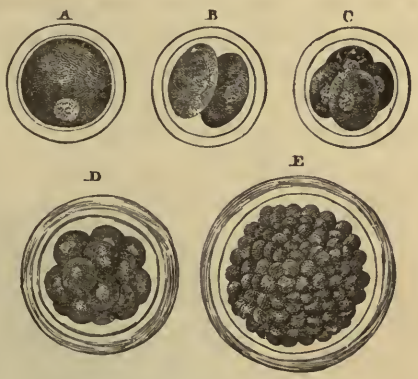
This process is continued until the ovum has become a mass of minute spheres, the whole resembling a mulberry, and called the muriform, or mulberry-like body (Fig. 3). These spheres are of various sizes; the larger and more transparent compose the epiblast, or upper germs; the smaller the hypoblast, or under germs.

The hypoblast remains in the centre of the ovum, while the epiblast surrounds it. The ovum, at this stage, is five or six days old, and usually passes from the oviduct to the uterus, where it lodges in an infolding of the endometrium, which undergoes various important modifications, fitting it to retain and nourish the embryo.

The membranes which envelope the ovum are known as de-

ciduous, and are, in the early stages of development, three in number. The first is the lining membrane of the uterus, on which the ovum rests, formerly called Decidua Serotina, now called Placental Decidua, because it enters into the formation of the placenta. The lining decidua of the uterus gradually extends over the ovum, finally covering it; this investing portion is called the Decidua Reflexa or Ovular Decidua. The third deciduous membrane covers the interior of the uterus, and is the Decidua Vera, or Uterine Decidua (Fig. 4).

Fig. 3.



E. The Muriform Body.

Returning to the ovum, we find that after the formation of the mulberry, or muriform body, a fissure appears between the epiblast and hypoblast, which separates them in such a manner as to form a vesicle inside the vitelline membrane, whose wall is formed by epiblast cells, with the hypoblast cells accumulated on a part of its internal surface; this vesicle is the blastodermic vesicle. It grows rapidly, the hypoblast flattening and extending within the epiblast.

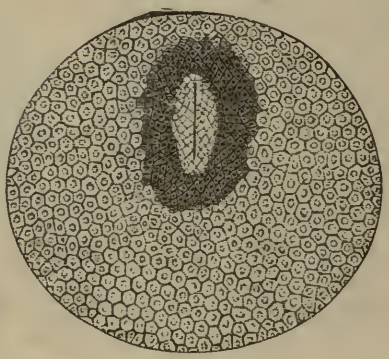
Fig. 4.

The Deciduous Membranes.

A third layer of cells is now formed, probably from the two others, called the mesoblast. From these layers are developed the various tissues and organs of the fœtus, as follows: from the

epiblast are formed the nervous system and parts of the organs of the special senses: from the hypoblast are formed the epithelium of the digestive and respiratory tract, the cylindrical epithelium of the liver ducts, the pancreas, thyroid gland and glands of the alimentary canal, and the hepatic and pancreatic parenchyma. From the mesoblast are derived the muscles, bones, connective tissue, arteries, veins, lymphatics and capillaries with the urinary and generative organs (Fig. 5).

Fig. 5.



The Embryonic Area and Axial Groove.

The epiblast, mesoblast and hypoblast unite in forming an embryonic area or Area Germinativa, which is oval in shape; in the centre of this body there appears a groove called the axial or medullary groove, which becomes enclosed by folds from either side forming a closed tube, the neural canal.

CHAPTER II.

THE EMBRYO.

The embryo now begins to take shape, and resembles rudely a boat with extremities of unequal size. The larger is the cephalic, the smaller the caudal extremity (Figs. 6 and 7).

Fig. 6.

Embryo, Seven or Eight Weeks Old.

The folding in of the blastodermic vesicle, which results in this boat shape, destroys its spherical form, and it becomes constricted into two parts, the smaller being embryonic, the larger forming the yelk membrane, or umbilical vesicle, which nourishes the embryo.

The embryo has not only the membranes derived from the uterus, but others which surround it, formed in the process of its own development. These are two in number, the amnion and chorion. The amnion begins in folds given off by the mesoblast and epiblast, finally joining to form a complete sac.

As the embryo grows, the yelk sac or umbilical vesicle gradu-

ally disappears, and another forms in its place, the Allantois, so called because it resembles a sausage. This in turn becomes constricted, and forms an outside and inside portion, that remaining within the body of the embryo forming the urinary bladder; that projecting without forms an umbrella-like expansion which, with layers from the mesoblast and epiblast, constitute the second of the fœtal membranes proper, the chorion. As growth proceeds, the blood vessels of the Allantois become so extensive as to form a part of the abundant circulation of the villi of the chorion. The allantoid sac contains an albuminous fluid, but its chief function is that of bringing blood vessels to the portion of the chorion forming the Placenta. As the embryo grows the Amnion forms two layers, the external of which joins the vitelline membrane, and the internal of which covers the fœtal surface of the placenta and also the umbilical cord (Fig. 8).

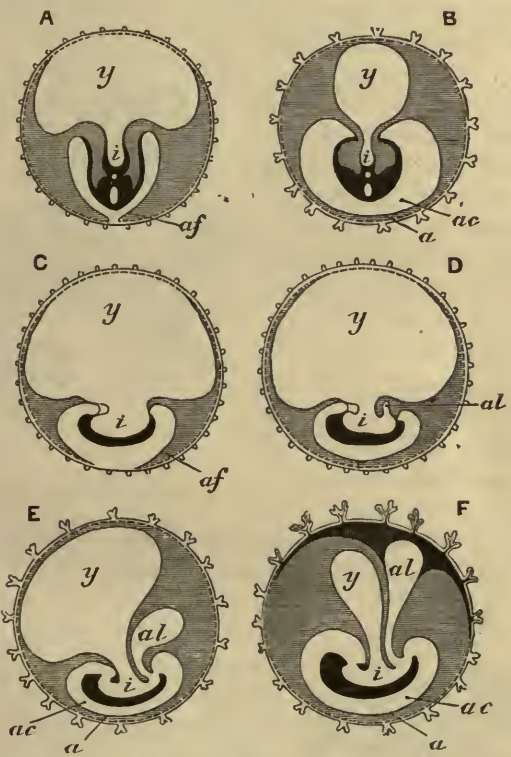
Fig. 7.

Ovum Six Weeks Old,
In the ovular decidua showing three openings.

Through the medium of the amnion is formed the amniotic fluid or liquor Amnii. This is generally yellowish, opalescent in color, faintly alkaline, with a specific gravity from 1002 to 1015. It contains from 1 to 1.5 per cent. of solids, which are chlorides, phosphates, sulphates and lactates of sodium, potassium and calcium, creatin and creatinin, albumin and mucosin and urea. The weight of the amnial liquid is greater than that of the fœtus during half of pregnancy, but after that period the fœtus outweighs this fluid. Its color varies to a dark reddish brown in women who work in tobacco, and in cases where the contents of the fœtal

intestine have been expressed into the amniotic sac. This fluid is derived from the fœtus and from the maternal blood vessels and those of the umbilical cord and placenta. The Amniotic fluid

FIG. 8.



THE AMNION AND ALLANTOIS.

A, *B*, Transverse sections of the Embryo. *C*, *D*, *E*, *F*, Longitudinal sections. *af*, Amnial fluid. *i*, Alimentary canal. *y*, Yelk sac or umbilical vesicle. *a*, The Amnion. *ac*, Amnial cavity. *al*, Allantois. The embryo is back downwards.

serves as an elastic buffer to protect the fœtus from violence, as a dilator during labor, protecting the cord from pressure, and also aiding in some degree in nourishing the fœtus. It renders fœtal

movements easy, and thus assists in the development of the fœtus, as illustrated by deformities resulting in fœtal limbs when the fluid is deficient.

Between the amnion and decidua the chorion is developed; it is derived from the vitelline membrane, or Zona Pellucida, which is at first a smooth membrane (Fig. 9). About the second week of pregnancy this smooth membrane becomes covered by tufts called villi; they are at first solid. About the fourth week, blood vessels begin to penetrate the villi, and the chorion becomes complete by the joining of the allantoid and an intermediate layer of the epiblast. The general hypertrophy of the villi which follows causes the ovum to resemble a chestnut burr whose projections are delicate and vascular. At the third month, the villi over the larger free surface of the ovum atrophy and disappear, while the villi at the attachment of the ovum to the uterine wall, at the placental decidua, become larger and more branched; the development of these villi and that of the placental decidua forms the placenta (Figs. 10 and 11).

Fig. 9.

Villi of Chorion (low power).

Fig. 10.

Villi (330 diameters).

This body is distinct first at the third month, being complete at the beginning of the fourth, or sixteen weeks of pregnancy. It is known as the "after-birth or mother-cake" and is a fleshy, flattened mass, usually six to eight inches in diameter, and varying in thickness from over

FIG. 11.

PLACENTAL VILLI AND DECIDUA.

an inch to one-fifth, being thickest where the cord is inserted. Its usual weight is eighteen ounces, but it varies with the weight of the child. The average weight of the placenta to that of the child is one-third from the seventeenth to the thirty-second week. Between the thirty-second and thirty-third week the placenta attains its acme of weight, and remains from one-third to one-fifth the weight of the child, unless influenced by derangements of the fœtal circulation, until birth at the fortieth week. After the fortieth week the placenta seems to grow rapidly in multiparæ,

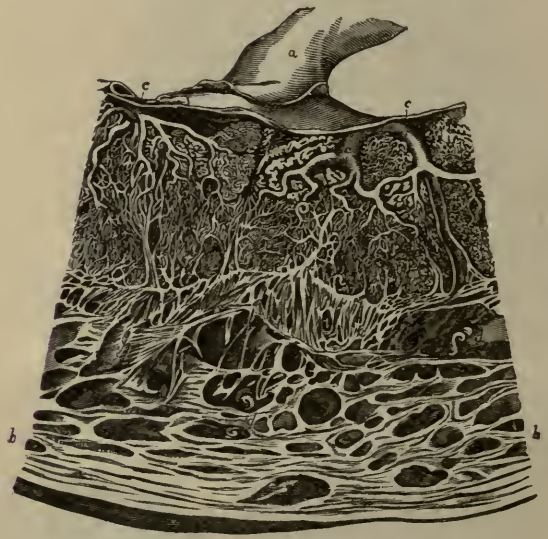
FIG. 12.

PLACENTA, MEMBRANES (stripped upward).

or with women having large children, thus raising the average from one-fifth to one-fourth. The external or uterine surface is dark red, divided into many areas by fissures, and covered by a delicate greyish membrane, the placental decidua. The internal, fœtal surface is smooth, a little depressed, yellowish in color, and formed of the chorion and amnion (Fig. 12).

The placenta is usually surrounded by a large vein, the circular

FIG. 13.



PLACENTAL AND UTERINE VESSELS.

a, Umbilical cord. *f*, *f*, Section of uterus. *c*, *c*, *c*, Umbilical vessels. *d*, *d*, Curling arteries of uterus.

sinus at its margin. It may be divided into many lobes of irregular shapes. The point of attachment of the placenta is usually in the upper portion of the uterus, either anteriorly or posteriorly.

Examination of the circulation of the placenta shows that the enlarged blood vessels of the decidua gradually lose their walls until only the endothelial cells of the lining membrane remain,

forming large sinuses which empty themselves partly through separate veins, and partly through the large vein or sinus at the border of the placenta, which communicates with the sinuses in the muscular tissue of the uterus; this may be termed the uterine portion of the placental blood system (Fig. 13).

The fœtal blood system consists of the villi and their vessels. The longer villi fit loosely into the decidual sinuses as a finger may be inserted into a glove too large for it. The shorter villi terminate in the superficial cellular strata of the decidua. It is quite possible to prove by the injection of different colored fluids into the uterus and placenta, that the blood vessels of each do not directly communicate, as is illustrated by the accompanying (Fig. 14).

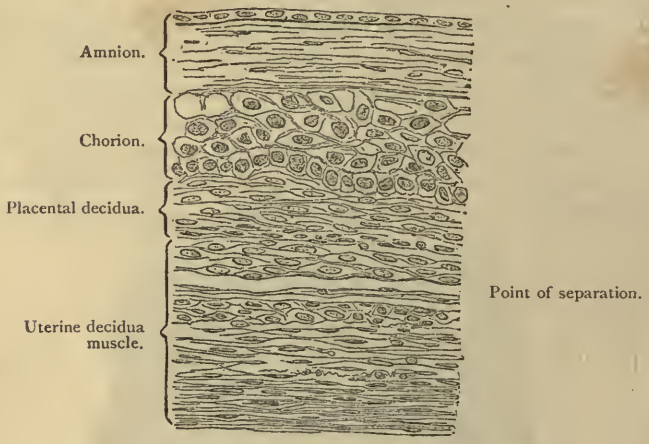
FIG. 14.

THE PLACENTA AND UTERUS (injected while adherent).

It is very common to find lime salts deposited in normal placentæ of children born at term, forming greyish masses which can be readily felt by the finger, imbedded in the placental tissue. The areas into which the uterine surface of the placenta is divided are called cotyledons; a placenta which has several supernumerary cotyledons connected with the principal mass is

called placenta succenturiata. The relation between the membranes and the wall of the uterus at term may be well shown by the accompanying (Fig. 15). It must be remembered that the

FIG. 15.



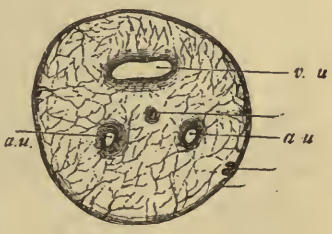
THE MEMBRANES. (Section through uterine wall).

chorion itself has neither vessels nor nerves; the villi grow only at those points where the vessels of the allantois pass into them to protrude, within the villi, into the endothelial sinuses of the decidua. The villi bud and subdivide luxuriantly in the decidua, often containing a capillary loop of allantoid vessels.

The placenta and fœtus are connected by the umbilical cord, which consists of blood vessels enclosed in a sheath of embryonal connective tissue known as Wharton's jelly. In ligating the cord after the birth of the child, this jelly may be pressed out from the stump of cord left upon the fœtus by grasping the stump with the thumb and index finger of one hand close to the umbilicus, pressure being made against the child's abdomen to prevent traction upon the umbilicus. With the thumb and fingers of the other hand the cord may be grasped and the jelly pressed out by traction away from the

child's body. The blood vessels are three in number, two arteries and one vein which is one sixth longer than the arteries. The arteries have especially strong walls, and although they twist in a spiral they very rarely become dilated into varicosities; the vein is large, with a thin wall and without valves. It comes from the placenta, and winding about the arteries passes to the fœtal liver. Pressure in the vein is greater than that in the arteries; the result is a twist usually from right to left in the cord. These spirals vary greatly in number, from none to forty or more, and form gradually early in pregnancy when the fœtus is freely movable and can follow the twisting of the cord. Later, the fœtus is too large and heavy to rotate evenly, and the cord may then coil about some portion of the fœtus or open loops remain (Fig. 16).

Fig. 16.



Cross Section of Cord.

v. u. Umbilical vein.
a. u. Umbilical arteries.

Lumps of Wharton's jelly which form along the cord are called nodes. In two-thirds of all cases the cord is inserted in the placenta between the centre and the margin: in one-fifth of the cases it is inserted in the centre, less often in the margin. When the umbilical vessels pass between the membranes to be inserted in the placenta it is called a velamentous insertion.

The cord is derived from the allantois with the umbilical vessels and the vitelline vessels. With Wharton's jelly as a padding or mould, its covering is the amnion. It is, at term, usually a little longer than the fœtus, over twenty inches: it is as thick as a man's little finger.

CHAPTER III.

THE FŒTUS AND ITS PHYSIOLOGY.

The term embryo is usually applied to the young being before the perfect formation of the placenta at the fourth month; after this period it is known as the fœtus. While the subject of embryology requires separate consideration, the practical interest of the obstetrician is concerned so far as the recognition of the probable stage of development reached by an embryo prematurely expelled, and the mode of production of the most frequent deformities.

During the first month the dorsal plates enclose the central neural canal in which are found the rudiments of the nervous system. The heart begins to beat at the third week, and the cavities of the body are formed at the end of the fourth week, the ovum being as large as a pigeon's egg, the embryo half an inch long. During the second month the face, head and ear develop, and hare lip and cleft palate may result from failure of union in the bones of the face and head. The eyes appear like black spots, the kidneys are formed, the fingers and toes are webbed, the ovum is as large as a hen's egg, the embryo an inch long, weighing one drachm; the cord is over an inch long.

At three months ossification begins, spina bifida resulting from failure of ossification in the lumbar vertebræ. At the fourth month the fœtus is six or seven inches long, the genital organs are distinctly developed, down (lanugo) forms on the skin, meconium is in the intestine, the limbs move. Such a fœtus may show heart-beats for some hours after birth; but no respiratory movements occur.

When five months advanced, the fœtus is ten inches long, the cord being twelve inches in length; hair is fully formed, and vernix caseosa is present. The fœtal heart can generally be

heard, and the mother usually appreciates fœtal movements. At six months the fœtus weighs a little over a pound, and presents many of the appearances characteristic of a full-term fœtus. It may live several days, but dies chiefly because the lungs are too imperfectly developed to admit of respiration. A few cases are recorded where a fœtus nearly seven months old has survived.

At seven months the fœtus weighs three or four pounds, the eye-lids are open, the testicles begin to descend, and the nails are almost formed. The child may live, is, in other words, viable; but its vitality is feeble. The eighth month is marked more by increase in weight than by any new developments.

At the ninth month, or at term, the fœtus is from nineteen to twenty inches long, weighing between six and seven pounds. Males exceed females slightly in weight.

There is no one positive sign that the fœtus is at term. By observing the presence of a number of characteristics, the age of a fœtus may be approximately estimated. Twenty inches may be taken as an average length. The body should be plump, covered by the cheesy substance called vernix caseosa, which is a secretion from the sebaceous glands of the fœtal skin; the nails should be firm, the cartilages of the nose and ear resisting, hair from one to two inches long; the child moves and cries lustily. The cord is inserted a little below the middle of the trunk. Children weighing twenty and twenty-two pounds have been born, whose parents were not monstrosities.

The following convenient table, constructed by Dührssen, will assist in forming an idea of the rate of fœtal development:

At the end of 1 month	$1 \times 1 = 1$ cm.	$= \frac{4}{9}$ inch.
At the end of 2 months	$2 \times 2 = 4$ cm.	$= 1\frac{7}{9}$ inches.
At the end of 3 "	$3 \times 3 = 9$ cm.	$= 4$ inches.
At the end of 4 "	$4 \times 4 = 16$ cm.	$= 7\frac{1}{9}$ inches.
At the end of 5 "	$5 \times 5 = 25$ cm.	$= 11\frac{1}{9}$ inches.
At the end of 6 "	$6 \times 5 = 30$ cm.	$= 13\frac{3}{4}$ inches.
At the end of 7 "	$7 \times 5 = 35$ cm.	$= 15\frac{5}{9}$ inches.
At the end of 8 "	$8 \times 5 = 40$ cm.	$= 17\frac{7}{9}$ inches.
At the end of 9 "	$9 \times 5 = 45$ cm.	$= 20$ inches.
At the end of 10 "	$10 \times 5 = 50$ cm.	$= 22\frac{2}{9}$ inches.

To obtain the length of the fœtus, multiply the month of pregnancy (1st, 2d, etc.) by a co-efficient,—1 for the first month, 2 for the second, etc., up to 5. After the fifth month the co-efficient remains 5. Thus at the seventh month the fœtus is 7×5 centimetres long, 35 cm., or $15\frac{5}{9}$ inches.

The nourishment of the fœtus is effected at first by the granular matter of the yelk or vitellus. It also acquires an albuminous coating in passing through the oviduct, which contributes to its nutrition; so soon as they are formed, the first chorial villi absorb nourishment from the decidua; the umbilical vesicle assists for a short time. The amniotic liquid probably contributes slightly to nourish the fœtus, although its functions in this respect are not positively known.

The great source of fœtal nourishment is the placenta; a direct interchange of gases and fluids takes place when the villi project into the mother's blood by the process known as osmosis, and this transfer of gases and solids in solution has been demonstrated by various substances which, when given to the mother, affect the fœtus.

There are two fœtal circulations, the first during the existence of the umbilical vesicle, the vitelline circulation; the second, the placental circulation. In the former, the heart is a tube giving off two vessels at its superior, and two at its inferior extremities. The heart's contraction forces blood through the two superior vessels, the aortic arches, into the embryo, thence into the vitelline arteries, through which it passes into the vitellus; it is returned by a sinus which surrounds the umbilical vesicle, and passes through the omphalo-mesenteric veins to the heart again.

At the beginning of the third month, the placental circulation commences. The fœtal heart is fitted for this circulation by two important modifications; one is an oval opening between the auricles called the oval foramen or Foramen Ovale, also Botall's foramen. In addition, the Eustachian valve, at the entrance of the inferior vena cava, is so formed as to turn the larger portion of blood into the left auricle, through the oval foramen and into the left ventricle. Two additional ducts or blood vessels are

needed for the circulation, a venous and arterial duct. The former, the ductus venosus, connects the umbilical vein with the inferior vena cava; the latter, the ductus arteriosus, joins the pulmonary artery and aorta just below the orifices of the arteries of the head and upper limbs.

The fœtal circulation will be best understood if we remember that the lungs are inactive during intra-uterine life; there is need for sufficient blood in the lungs to provide for their growth, but not for pulmonary respiration, as the fœtus respires through its absorption of oxygen from the maternal blood. Starting at the placenta, we find the purified and oxygenated blood passing through the umbilical vein at the umbilicus. It will be noticed that an exception is formed to the general law that oxygenated blood is carried by arteries only. From the umbilical vein it passes through the venous duct to the inferior vena cava, where it is joined by the blood from the lower portion of the fœtal body; a little of this blood goes to the liver, and blood from the liver is emptied into the vena cava. From the vena cava the blood passes into the right auricle, where the Eustachian valve turns the stream out of its usual course through the oval foramen into the left auricle; thence it goes, as usual, into the left ventricle.

When the heart contracts, the blood is sent from the left ventricle into the aorta, from the right ventricle into the pulmonary artery. The blood from the left ventricle goes to nourish the head and arms; blood from the right ventricle, being needed in the lungs in small quantity only, the greater portion passes through the arterial duct into the aorta. It will be observed that venous blood is carried by the arterial duct and arterial by the venous duct, a reversal of what is usually the rule, resulting from the inactivity of the fœtal lungs. The aorta finally contains mixed blood, which passes partly to the lower limbs and partly through the umbilical arteries to the placenta (Fig. 17).

The fœtal organ which receives the purest blood is the liver, because important nutritive functions are carried on in that organ. The head, arms and trunk receive purer blood than the legs, hence their better development. As the fœtus has little

FIG. 17.

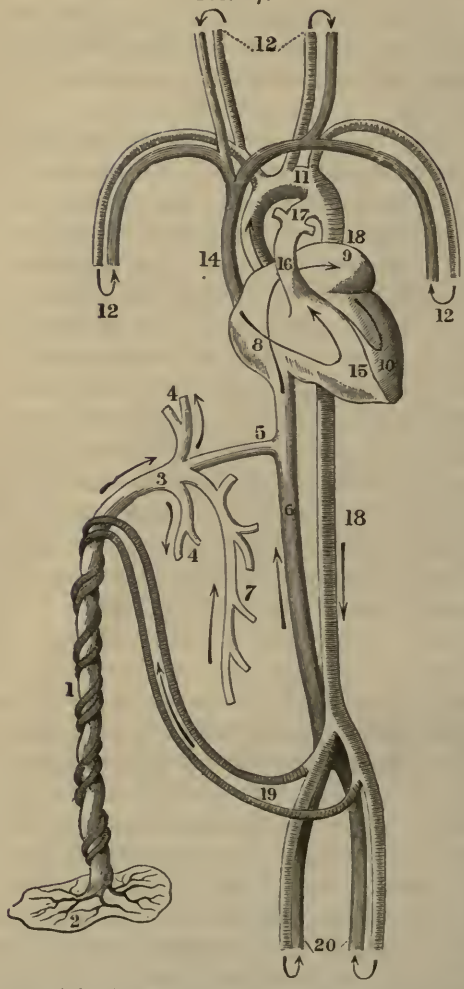


FIG. 17.—Diagram of the fœtal circulation. 1, the umbilical cord, consisting of the umbilical vein and two umbilical arteries, proceeding from the placenta (2); 3, the umbilical vein dividing into three branches—two (4, 4) to be distributed to the liver, and one (5) the ductus venosus, which enters the inferior vena cava (6); 7, the portal vein, returning the blood from the intestines, and uniting with the right hepatic branch; 8, the right auricle—the course of the blood is denoted by the arrow proceeding from 8 to 9; 9, the left auricle; 10, the left ventricle—the blood following the arrow to the arch of the aorta (11), to be distributed through the branches given off by the arch to the head and upper extremities; the arrows (12) represent the return of the blood from the head and upper extremities, through the jugular and subclavian veins, to the superior vena cava (14), to the right auricle (8), and in the course of the arrow through the right ventricle (15) to the pulmonary artery (16); 17, the ductus arteriosus, which appears to be a proper continuation of the pulmonary artery—the offsets at each side are the right and left pulmonary arteries cut off; the ductus arteriosus joins the descending aorta (18, 18), which divides into the common iliacs, and these into the internal iliacs, which become the umbilical arteries (19), and return the blood along the umbilical cord to the placenta, and the external iliacs (20), which are continued into the lower extremities. The arrows at the termination of these vessels mark the return of the venous blood by the veins to the inferior cava. (After Carpenter.)

need for powers of locomotion, the growth of these organs comes after the development of more vital parts. Fœtal respiration is accomplished by the passage of oxygen from the mother's blood to the red blood corpuscle of the fœtal blood. This results from osmosis, a physical property of gases which enables them to pass through animal membranes under certain conditions which are present in the placenta.

There is abundant need for oxygen in the fœtus, and its blood often contains more hæmoglobin than its mother's. Whatever stops circulation in the umbilical cord kills the fœtus by asphyxia. The temperature of the fœtus is about one degree higher than the mother's. The metabolic changes in the fœtal body while in the uterus are much slower than those in the mother's, and as it stores up oxygen it often survives for some time after its connection with the mother is cut off by separation of the placenta. The various secreting glands of the fœtal body are formed and active at term. The great size and activity of the fœtal liver is caused, not by excessive formation of bile, but by important processes in the formation of blood corpuscles which go on in that organ. Bile is formed as early as the third month, and the intestines contain meconium, a tarry substance resembling burnt molasses, composed of bile and intestinal juices, with substances swallowed from the amniotic liquid. While reflex motions have been observed on irritating a fœtal limb through the uterine wall, conscious movement does not exist for some time after birth. The gustatory nerve responds to bitter substances in children born at seven and eight months.

The Fœtus at Birth.—At two hundred and seventy days the human fœtus measures on an average twenty inches in length, weighs from six and one-half to seven and one-half pounds, and is marked by the characteristics already mentioned. The diameters of its head will be considered in relation with those of the birth canal of the mother. The diameter of its trunk, which is of the greatest practical importance to the obstetrician, is the bis-acromial. This is measured from one acromian process to the other, and is on the average twelve centimetres or four and three-fourths inches

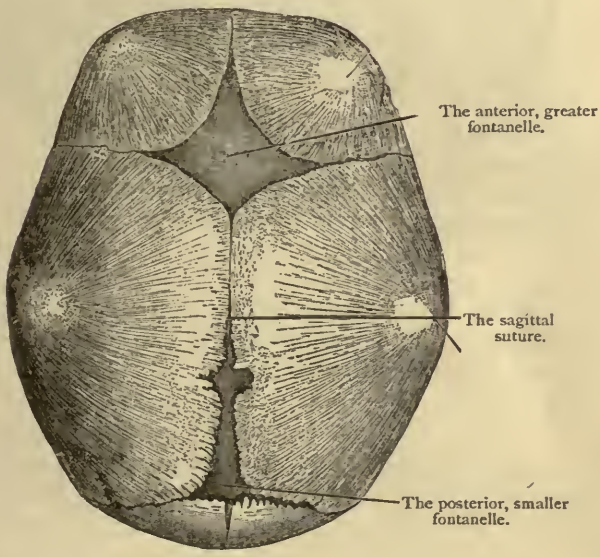
in extent; it is capable, however, of considerable reduction by pressure during labor, from the fact that the fœtal bones possess considerable elasticity. The fœtal lungs at this time are capable of inflation, while the other organs of the fœtal body have already established their various functions.

The Fœtal Head.—The fœtal head is of especial interest and importance to the obstetrician, because it is the largest portion of the fœtus and therefore is most likely to occasion difficulty in its passage through the birth canal of the mother. It is composed at birth of two parietal, two temporal and frontal and an occipital bone, which are not yet solidly united. The facial bones of the fœtus are more nearly united at birth than are the bones of the skull, nature seeming to leave the latter imperfectly joined to favor the moulding of the head. The spaces between these bones are known as sutures; they are the sagittal or arrow suture, extending antero-posteriorly in the middle of the cranial vault; the fronto-parietal, extending at right angles to the sagittal between the frontal and the parietal bones, and the lambdoid, separating the two parietal bones from the occipital. Two spaces between the bones of the skull are found at the junction of the frontal and the two parietal bones, and at the junction of the two parietal with the occipital. The former, the larger, is called the anterior fontanelle and also the bregma; the latter is known as the smaller or posterior fontanelle (Fig. 18). Other fontanelles are sometimes found between other bones of the skull. These two fontanelles are of special interest to the obstetrician because their recognition assists greatly in diagnosticating the position of the fœtal head during labor. The anterior or greater remains unaltered by the pressure exercised upon the head and always admits the tip of the examining finger during labor. It is to be recognized by the fact that four bony lines or sutures extend from this fontanelle. The posterior or smaller fontanelle, on the contrary, is often obliterated by the pressure upon the fœtal head during labor, and its site is distinguishable only from the fact that three bony lines can be identified as extending from this fontanelle (Fig. 19).

The recognition of the anterior and posterior fontanelle enables

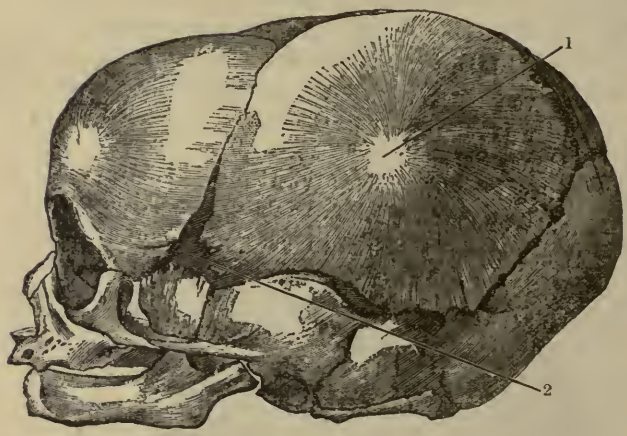
the obstetrician to locate the frontal and occipital regions of the head. The diameters of the fœtal head are measurements taken between certain bones by which its size is estimated. These diameters are those of length, width and depth; there are four diameters of length, the maximum or greatest extending from the

FIG. 18.



chin to a point in the sagittal suture midway between the fontanelles. It measures thirteen and a half centimetres, or five and one-third inches. The next diameter of length is the occipito-mental, measured between the point of the chin and the occipital protuberance. It is thirteen centimetres, or five and one-eighth inches. The most important diameter of length, when the mechanism of labor is concerned, is the occipito-frontal, from the root of the nose to the occipital protuberance. It measures twelve centimetres, or four and three-fourths inches; a diameter of length which is frequently substituted for the preceding in the mechanism of labor is the sub-occipito-bregmatic; it is measured

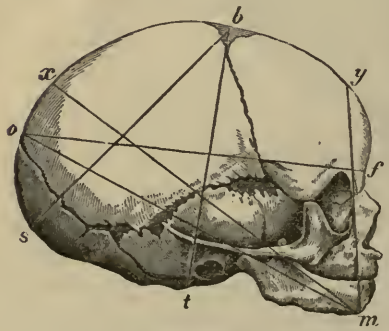
FIG. 19.



1. The parietal eminences. 2. The lateral fontanelles.

from the middle of the anterior fontanelle to the under surface of the occipital protuberance, nine and a half centimetres, or three and three-fourths inches (Fig. 20).

FIG. 20.



o f. Occipito-frontal diameter.
o m. Occipito-mental diameter.
x m. Maximum diameter.
b s. Sub-occipito-bregmatic diameter.
t b. Trachelo-bregmatic diameter.
y m. Fronto-mental diameter.

Measures in width are two in number—the bi-parietal between the protuberances of the parietal bones, nine and five-tenths centimetres, or three and three-fourths inches, and the bi-temporal, eight centimetres, or three and one-eighth inches.

The measures of depth are two in number—the fronto-mental, between the forehead and the chin, measures eight centimetres, or three and one-eighth inches, and the trachelo-bregmatic, between the middle of the greater fontanelle and the

neck in front of the larynx, nine and a half centimetres, or three and three-fourths inches; the greatest circumference coincides with the maximum diameter, measuring thirty-seven centimetres, or fourteen and one-half inches.

CHAPTER IV.

THE BIRTH CANAL.

It will now be necessary to consider the birth canal of the mother, and to compare these measurements with those of the fœtus just stated. At labor the uterus, sinking at first into the pelvis, forms an irregularly cylindrical cavity, the axis of which is the line of direction followed by a body in passing through this cavity; the lower elastic portion of the uterus is retained in the bony pelvis during the last weeks of pregnancy and the first hours of labor, and its dimensions are practically those of the bony canal.

The uterus in pregnancy may be divided into three portions. The first is the expulsive, consisting of the strong interlacing muscular fibres at the fundus, which end in a border or ring. The second is the tissues between this border or ring and the internal os, known as the lower uterine segment; while the third extends from the internal through the external os, forming the cervix. The lower uterine segment is the elastic portion of the uterus, and is composed of fibrous and muscular tissue capable of considerable distension (Fig. 21).

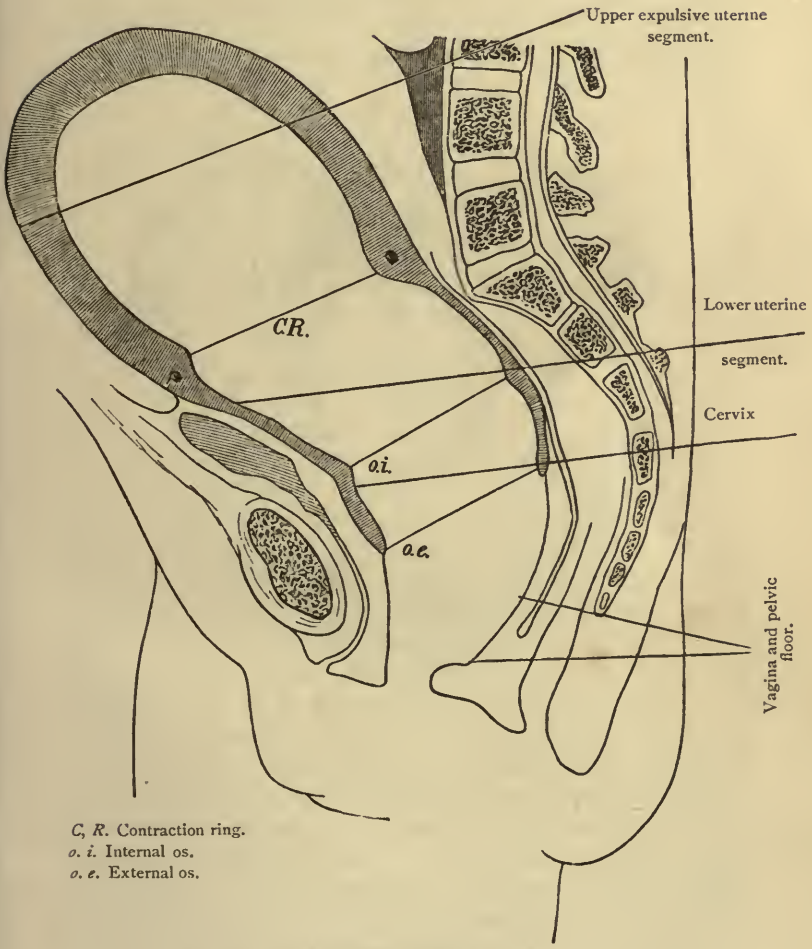
Before pregnancy, it is impossible to recognize this lower segment of the uterus, and its length increases during this period till at term, when it may be demonstrated between the lower border of the upper or expulsive uterine segment, and the internal os; the cervix retains its former length during pregnancy and labor.

In the early stages of labor, the cervix and lower uterine segment are contained in the bony pelvis, but as labor proceeds, the upper expulsive segment of the uterus contracts and retracts, thus drawing the elastic or lower uterine segment just above the brim of the pelvis.

The diameters of the bony pelvis are the measurements most important in studying the mechanism of labor, and determining whether or not the normal fœtus can pass through the pelvis.

The most important region of the bony pelvis is the entrance or

FIG. 21.

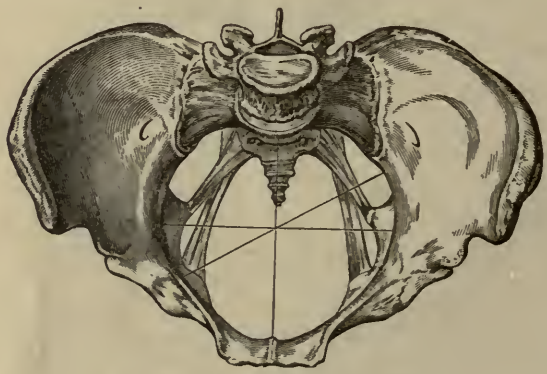


THE BIRTH CANAL.

superior strait; this is also known as the pelvic brim, its measure-

ment from the posterior surface of the pubic joint to the projection or promontory of the sacrum being eleven and one-half centimetres, or four and one-half inches. This is the most important measurement in the birth canal, and is known as the true conjugate, or antero-posterior diameter of the brim (Fig. 22).

FIG. 22.



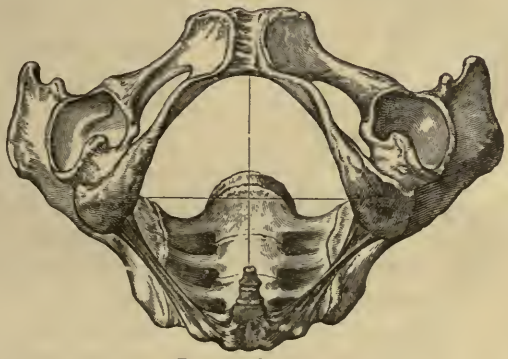
DIAMETERS OF PELVIC BRIM.

The diagonal or oblique measurements at the brim of the pelvis extend from one sacro-iliac joint to the ilio-pectineal eminence of the opposite side; they measure twelve and one-half centimetres, or four and three-fourths inches. Transversely, from side to side, the brim of the pelvis measures thirteen and one-half centimetres, or five and one-third inches; this last measurement is that in the bony pelvis; in the pelvic canal of the living patient the muscular and other tissues reduce the transverse diameter, making it less than the oblique. This reduction is largely effected by the iliopsoas muscles of each side, which may be relaxed by flexing the thighs upon the body; hence during the first stage of labor, when delay occurs in the descent of the head into the pelvic brim, it is often advantageous to flex the patient's thighs, thus rendering these muscles relaxed and facilitating the descent of the presenting part below the brim.

The cavity of the pelvis is found to measure, on an average, twelve and one-half centimetres in diameter, or four and seven-tenths inches. This measurement is of interest because it is sufficiently great to allow the head, when perfectly flexed or perfectly extended, or the breech of the child, to rotate freely during labor. The pelvic brim having been passed, there is evidently no reason why the mechanism of labor should be impeded, so far as the dimensions of the pelvic cavity are concerned.

Passing to the outlet of the pelvis the average diameter is eleven centimetres, or little over four inches. The most important measurement of this region is the anterior-posterior diameter, from beneath the pubic joint to the tip of the coccyx. This is

FIG. 23.



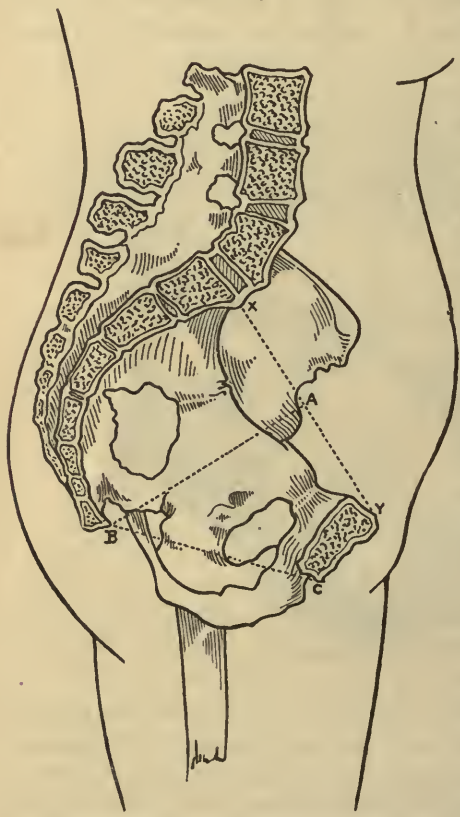
PELVIC OUTLET.

increased during labor to measure from thirteen to fifteen centimetres, or from five to five and one-fourth inches. The transverse diameters of the pelvic outlet measure four and one-third inches, or eleven centimetres (Fig. 23).

The birth-canal of the mother, however, is but partially described in a description of the pelvis; but a portion of the uterus is contained in the pelvis at labor, and this important organ and also the floor of the pelvis must be considered in any study of the birth canal. It has been shown by means of frozen sections and

post-mortem examinations, as well as by observations upon the living patient, that during labor the fundus of the uterus extends forward above the line of the pubic joint. The axis of the birth canal is that line which would be taken by a globular or cylindrical body moving through this canal. Such a line would extend from the fundus of the uterus downward and backward until it should meet the posterior portion of the pelvic floor; it would then be deflected at nearly a right angle upwards and forwards, to emerge beneath the pubic joint (Fig. 24).

Fig. 24.



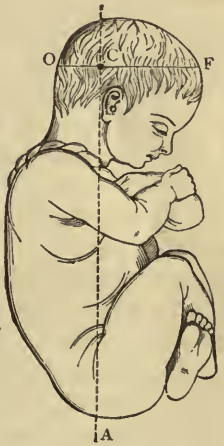
X Y. Antero-posterior (sacro-pubic) diameter of brim.
A B C. Composite line representing axis of birth canal.

It is to be remembered that the pelvic cylinder is so formed by a combination of bony and membranous tissues, that resistance and elasticity are counterbalanced, thus favoring rotation of the presenting body. During pregnancy the pelvic joints share in the general hypertrophy of this region. The pubic joint becomes specially enlarged and its mobility is greatly increased. This may become, in some cases, a source of great annoyance to the patient and may necessitate rest in bed

or the application of a strong bandage. Ordinarily, however, the other joints of the pelvis, although enlarged, do not show increased mobility.

A comparison of the diameters of the fœtus with those of the birth canal will serve to explain the phenomena of labor. It will be remembered that the maximum diameter of the fœtal head is greater than any diameter at the brim of the pelvis in the living patient. The same is true of the occipito-mental. It is evident then, that the head must enter the pelvis in its descent in such a position that neither the maximum or the occipito-mental diameter shall be brought to present to either of the diameters of the pelvic brim. The avoidance of this occurrence results from the fact that the fœtal head is placed upon the trunk as a lever upon its fulcrum. If a fœtus be held perpendicularly and the head be allowed to drop freely, it falls towards the front, the chin resting upon the breast. This then is the longer arm of the cranial lever; the shorter arm being the distance from the centre of the head to the occipital protuberance (Fig. 25). The result of this movement of the head is to substitute for either of the two long diameters mentioned a shorter one, thus in place of the maximum diameter of 13½ cm. or 5⅓ inches or the occipito-mental 13 cm. or 5⅛ inches, there is presented the occipito-frontal 12 cm. or 4¾ inches or the sub-occipito-bregmatic 9½ cm. or 3¾ inches. A comparison of these last two diameters with those of the pelvic brim will show that when the compression which the mother's soft parts undergo is taken into account, there is no reason why the head when flexed, with the chin upon the breast, should not pass through the pelvis. If the motion opposite to flexion, extension, occurs, one of the vertical diameters of the head is substituted for one of the two

Fig. 25.



A, C. Axis of fœtal body.
C. Fulcrum.
O, C. Short arm of lever.
C, F. Long arm of lever.

greatest and thus descent is possible; it will be noticed, however, that either flexion or extension must be present, otherwise a large diameter will be presented which cannot pass.

The Pelvic Floor.—The study of the pelvic floor is of special interest to the obstetrician. It is that portion of the birth canal most frequently injured in labor and most often demanding repair. From the standpoint of practical obstetrics it may be regarded as composed of two segments: the anterior, upper, shorter segment and the lower, posterior, longer segment. The former embraces the anterior wall of the vagina and the tissues beneath the pubic joint, while the latter comprises the strong muscles and fascia attached to the sacrum and coccyx. At the moment of labor the second or sacral segment is stretched strongly downward and backward by the advancing fœtus, while the first or pubic segment is pushed upwards beneath the pubes.

From the standpoint of obstetric anatomy, the levator ani muscle and the fascia and muscular slips attached to the perineal body are the most important tissues in the pelvic floor. These tissues may be divided into three portions: the pubo-coccygeus, embracing the muscles arising beneath the pubic joint and prolonged to the sides of the pubes, with the anterior wall of the vagina and the urethra; the obturato-coccygeus muscle, which arises from the obturator fascia and sides of the pelvis, and the ischio-coccygeus, which includes the muscular slips having origin from the sides of the ischium. The first of these three divisions is known as the pubic, the remaining two as the sacral segment of the pelvic floor. The importance of the perineal body consists in the fact that it is the point of blending and membranous attachment for the interlacing muscular fibres of the superficial tissues of the pelvic floor. While, from the standpoint of the anatomist, the pelvic floor requires minute analysis and description, the obstetrician will gain little by any but a practical study of this region and its functions.

During labor the presenting part descends in the axis of the pelvis downward and backward until the sacral segment of the pelvic floor is reached. The resistance afforded by the muscles

already mentioned as comprising this segment, with the strong coccygeal fascia, exerts a considerable obstacle to the progress of the head, and forces it upward and forward beneath the pubic joint. The anterior or pubic segment of the pelvic floor is lifted upward and greatly compressed beneath the pubic joint by the presenting part. The movement of the coccyx upon the sacrum at the sacro-coccygeal joint and the elasticity of the tissues enable the sacral segment to move downward and backward. The movements of the two segments of the pelvic floor may be likened to those of folding doors swinging in opposite directions. In the space left between these segments, room is afforded for the escape of the presenting part.

Regarding the question of injury to the pelvic floor, it is a familiar fact that it is not a simple linear tear which results in serious disability, but the separation from their points of attachment to the sides of the pelvis and their insertions into the perineal body of the muscles, which have been collectively described under the heads of the segments of the pelvic floor; and it is also evident that in the repair of recent injuries it is not sufficient to simply bring the superficial parts in accurate apposition. Beginning from above, the laceration in the vagina should be brought together until the perinæum is reached. It is well then to begin a second line of sutures extending from the lower end of the tear in the perinæum upward to meet the first. Inequalities in the tissues can then be adjusted and an accurate closure be made. The suture should be carried beneath the entire surface of the tear, emerging and re-entering, if desired, in the centre of the tear.*

By reference to the movements of the segments of the pelvic floor, we appreciate the advantages of that method of delivery in head presentations which consists in pushing the pubic segment upward and backward by pressing the head up beneath the pubic joint with the left hand, passed between the mother's thighs, while the right, spread out upon the sacral segment of the pelvic floor,

* For more explicit directions for closing such lacerations, the reader is referred to the treatment of the accidents of labor.

regulates the stretching of these parts by the head as it advances, estimates the elasticity of this segment, and finally allows it to retract, between the pains, over the head of the child.

As the orifice of the birth canal at the vulva becomes an oval, with tense edges, during delivery, it will be seen that lateral incisions at the centre of each side of the oval will enable both pubic and sacral segments to retract to better advantage. Such a procedure is termed episiotomy.

CHAPTER V.

THE MOTHER IN PREGNANCY.

Changes in the Mother occasioned by Pregnancy.—These may be described as of two kinds: functional and organic. Under the first may be considered disturbances of digestion, and of the functions of the nervous system, while under the latter may be included the various hypertrophies in the tissues of the body, including the uterus, variations in the composition of the blood, and structural changes in the skin and in the excretory organs.

The first and most common functional change consists in the variations in appetite and digestion commonly observed. There is no anatomical reason for these abnormalities, and they must be classed as reflex, temporary and functional. They consist of nausea, repugnance to food, appetite for unusual articles of diet, excessive or diminished appetite. The result of these functional disturbances is usually a temporary condition of anæmia, which often disappears as pregnancy advances. In many patients, a full and even ravenous appetite after the third month of pregnancy, produces a condition of plethora. In some, assimilation, which is ordinarily defective, is greatly stimulated by pregnancy.

Disturbances of the nervous system consist in an increased sensibility to reflexes; heightened excitability of the central and peripheral nervous system, manifested by melancholia or exaltation, apprehension, increased imagination and, very commonly, forebodings of evil. The sympathetic nervous system is especially liable to functional variations, and the balance ordinarily maintained in the organism seems to disappear on a slight cause which occasions general perturbation, the action of the heart and respiration being especially affected.

The most important structural changes occur in the genital organs. The uterus becomes twenty times heavier than before

pregnancy; its surface about seventy times larger; its capacity several hundred times as great. Its muscle hypertrophies by the development of embryonic muscle nuclei. Its walls are thinner than in the non-pregnant uterus, but elastic and resisting. The endometrium undergoes corresponding hypertrophy in its glandular elements. The entire genital tract shares in the hypertrophy of the uterus, in its muscular, elastic and epithelial structures. The neck of the womb softens, the difference being very noticeable on touch. In first pregnancies the external os is usually closed during pregnancy; in women who have borne many children it can be readily entered by the finger.

The hypertrophies otherwise observed are found in certain portions of the mother's skeleton, as the inner table of the skull and about the joints. The vascular system is marked by hypertrophy of the left ventricle and of the muscular coat of the arteries. The skin is altered by the deposit of pigment in various portions of the body, forming the areola around the nipple, for example, and the excretory organs undergo a general glandular hypertrophy, which consists in a multiplication of the cells of the various organs. The same change is observed in the secretory organs of the body. The changes in the blood are at first a diminution in the red corpuscles and hæmoglobin, followed by a decided increase as pregnancy advances. The loss of blood usually occurring at labor results in temporary diminution of the amount of corpuscles and coloring matter, followed during the healthy puerperal state by an increase to an amount equal to or greater than that found during pregnancy. As the red corpuscles and hæmoglobin diminish, the white corpuscles and water increase; albumin diminishes at first, as does fibrin, but toward the latter months of pregnancy fibrin increases very considerably.

Marked anæmia occurring during pregnancy cannot be regarded as physiological, but is usually caused by improper hygienic surroundings. Anæmia after labor is usually the result of hemorrhage, and occasionally follows the establishment of the function of lactation; as a rule, however, when the secretion of milk is well established, anæmia should give place to a normal condition of the blood, and very often to slight plethora.

CHAPTER VI.

THE DIAGNOSIS OF PREGNANCY.

While many conditions exist which may justify a presumptive diagnosis of pregnancy, yet a certain diagnosis of this condition cannot be made before the existence of the fœtus is appreciable by sight, hearing, or the tactile sense. The conditions upon which presumption may be based are the cessation of menstruation, nausea, occurring in the early morning, abnormal sensibility with sensations of prickling, stinging, or sharp pains through the mammary glands, with discoloration about the nipples: a sensation of weight or fullness of the lower portion of the abdomen, and those ill-defined sensations which cause the woman to believe that pregnancy exists. These conditions, however, may all be present, and yet the patient not be pregnant.

Again, from the standpoint of the physician, presumptive evidence may be found of pregnancy, and yet the condition be absent. Any cause which produces an enlargement of the uterus and softening of the neck and mouth of the womb may give rise to a presumption of pregnancy, especially if menstruation is absent; but it must be insisted upon that it is not until the physician can feel the movements of the fœtus, or see those movements through the abdominal wall of the mother, or hear the beating of the fœtal heart, that a positive diagnosis of pregnancy can be made.

A strong presumption that ectopic or extra uterine pregnancy exists may be based upon absence of menstruation; a tumor found by examination near the uterus, but distinct from it: changes of the mammary glands; the fact that the uterus itself can be demonstrated to be but slightly enlarged, and the occurrence of irregular attacks of hemorrhage. While there is no one symptom on

which a positive diagnosis of ectopic pregnancy can be made, yet if decidual membrane can be demonstrated as discharged coincidently with hemorrhages, a very strong presumption exists, especially if the other symptoms be present.

If the physician be consulted by a patient who has reason to suppose herself in the early months of pregnancy, a careful examination should be made, and if a strong presumption exists, this fact should be stated to the patient. She should be instructed regarding the hygiene necessary for this period, and informed that a positive diagnosis cannot be made for several weeks or months. As early in pregnancy as possible, the physician should examine his patient thoroughly to make a positive diagnosis of pregnancy, and also to determine the presence or absence of any abnormalities of the pelvis or birth-canal of the mother. A second examination at seven or eight months should be made to diagnosticate the position of the fœtus, and to determine the necessity for version or some procedure to alter an abnormal position at the occurrence of labor.

When the first examination takes place, it is well to make an appointment with the patient to come to the physician's office, or that he may call upon her at her home. The assistance of a friend or nurse is often advantageous and agreeable. The patient should be instructed to lie upon a bed or couch, clad so that but one thickness of linen will be found covering the abdomen and pelvis. The physician should palpate the abdomen carefully, mapping out the enlarged uterus, and auscultate for fœtal heart-sounds, being careful to take sufficient time to recognize them, and then measure the patient's pelvis. All of this can be done through one thickness of linen, if that linen be not new and stiff.

The pelvic measurements which should be invariably made are but three in number: they are, between the anterior superior spines of the ilia, twenty-six and one-half centimetres, or, in round numbers, ten inches; between the crests of the ilia, twenty-eight centimetres, or eleven inches; from beneath the spine of the last lumbar vertebra to the middle of the pubes, eight inches, or twenty

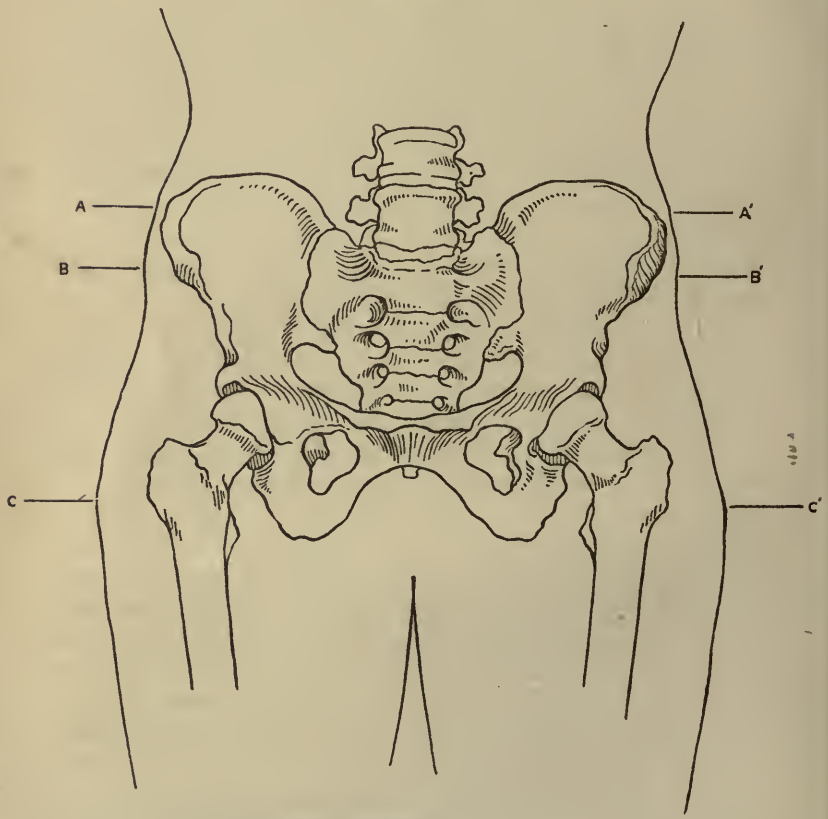
and one-half centimetres. This measurement is known as the external or Baudelocque's conjugate diameter. Three and one-half inches or nine centimetres should be subtracted for the thickness of the sacrum and pubes. Four and one-half inches, eleven centimetres, the remainder, is known as the internal conjugate, or conjugata vera. To make the last measurement, the patient should turn upon her side, her thighs flexed, and lying conveniently with her face turned away from the physician. Should doubt exist as to the location of the last lumbar spine, visual inspection of the back may be made without offending the patient. If the three measurements given are found to be normal, the probability that any deformity in the bony birth-canal exists sufficiently great to complicate labor, is very slight. The distance between the trochanters may also be conveniently measured; it is thirty-two centimetres, or thirteen inches (Fig. 26).

At the second examination the position of the fœtus should be carefully outlined by palpation, and auscultation be repeated. Palpation is best performed by standing with the face towards the patient's feet, the extended hands resting lightly upon the patient's abdomen. By gentle pressure simultaneously with both hands, a sense of resistance can usually be readily appreciated, which will indicate the location of the child's back. The finger tips of each hand should then be placed in line parallel with Poupart's ligament on each side; by gentle, but deep pressure downwards and inward, the presenting part is felt. If now both hands be moved together either to the right or left, the head or breech will be felt to move with the hands. In women whose tissues are relaxed, the position of the head, in extension or flexion, can often be determined. The site of the placenta can occasionally be found by palpation, when it is situated upon the anterior wall of the uterus. In multiple pregnancies, the observer must outline three large fœtal parts or extremities before a diagnosis can be made by palpation. Two distinct fœtal hearts must be heard by auscultation to make a diagnosis positive.

Information of value may also be gained by the obstetrician if, during palpation, he will notice the muscular development

and consistence of the abdominal walls, as their contraction furnishes an important accessory force in labor. The bladder should be invariably emptied before palpation, as a full bladder

FIG. 26.



A A'. Distance between crests of ilia.
B B'. Distance between anterior superior spinous processes of ilia.
C C'. Distance between trochanters of femora.

renders an accurate examination impossible. During palpation fœtal movements are appreciated by the fingers, and often seen

in cases where the fœtus moves vigorously. In hysterical or maniacal patients a slight degree of anæsthesia may be required for a satisfactory examination. On auscultation, in head presentations the heart sounds are heard below the umbilicus, on the left or right side; in breech presentations above the umbilicus; in transverse positions near the pubes. A loud, rushing sound, synchronous with the mother's pulse, is the uterine souffle, caused by the blood in the enlarged uterine sinuses. A faint, rapid hissing sound is the umbilical souffle, a murmur in the cord which is twisted about the fœtus. Gas may be heard to crackle in the mother's intestines.

In doubtful cases, percussion must be resorted to in distinguishing the pregnant uterus from ovarian tumors or ascites. It will be remembered that the pregnant uterus forms a solid or semi-solid tumor occupying the centre of the abdomen, surrounded on three sides by intestines which usually give a resonant note on percussion. If the patient be turned upon either side, the relative position of the dull and resonant note changes but slightly, while in ascites the gravitation of fluid to the sides alters the location of dullness. An ovarian cyst can be distinguished in its early growth as located more upon one side of the pelvis. A uterus enlarged by fibroids which are undergoing a cystic and often malignant degeneration may give the same phycal signs as the pregnant uterus.

Percussion of the pregnant abdomen should also give information regarding the size of the uterus, and hence the period of pregnancy. In general, we may say that the uterus can first be felt above the pubes at the fourth month. In the sixth month it is at the umbilicus; at the end of pregnancy, a hand's breadth above the umbilicus. We add a table, constructed by Dührssen, showing the size of the uterus at the different months of pregnancy:

In the 1st month the uterus is slightly enlarged.

In the 2d month the uterus is as large as a goose egg.

In the 3d month the uterus is as large as a child's head.

In the 4th month the uterus is as large as a man's head, and can be felt by external examination above the symphysis pubis.

In the 5th month the uterus is half-way between the umbilicus and the symphysis.

In the 6th month it is at the umbilicus.

In the 7th month it is two fingers' breadth above the umbilicus.

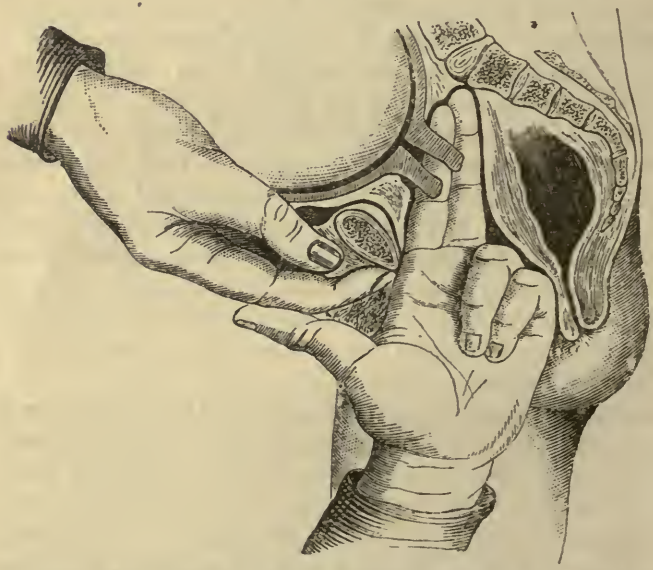
In the 8th month it is the width of the hand above the umbilicus.

In the 9th month it is at the xyphoid process.

In the 10th month it is again the width of the hand above the umbilicus.

If anything abnormal be detected in the position of the fœtus indicating disproportion between the child and the mother's pelvis, an internal examination should be made (Fig. 27). To measure

FIG. 27.



INTERNAL MEASUREMENT OF THE ANTERO-POSTERIOR DIAMETER OF PELVIC BRIM.

the antero-posterior diameter of the pelvic brim (conjugata vera, true conjugate) the patient is placed on her back at the edge of a bed or table, her thighs flexed. The bladder and rectum being empty, the physician introduces the index and second fingers of

one hand, pushing the cervix aside, and touching the promontory of the sacrum with the second finger. The edge of the hand is raised against the sub-pubic ligament, and with the nail of a finger of the other hand the point where the edge of the pubes presses is marked upon the examining hand, which is then withdrawn, and the distance from the tip of the second finger to the point marked is measured by tape line or pelvimeter. Two centimetres, or three-fourths of an inch, is deducted for the thickness of the pubes. The measurement first obtained is thirteen centimetres, less two, is eleven centimetres, or four and a half inches. It is well to follow the sacral curve upwards with the examining finger, to avoid mistaking the projection of other sacral vertebræ for the promontory.

If the maternal parts be relaxed and labor be approaching, it is well to attempt to estimate the proportionate size of the fœtus and the pelvis by pressing the presenting part gently downward

FIG. 28.

into the pelvis while its progress is recognized by an internal examination. It cannot be too strongly urged that it is the duty of the physician to make preliminary examinations in every case, as experience has shown us that they can be so conducted as to give the patient no inconvenience, while affording valuable data for the conduct of labor.

The pelvimeter which we commonly employ is indexed in centimetres and inches, and can be conveniently taken apart and carried in the pocket (Fig. 28).

In making a vaginal examination to determine the existence of early pregnancy, in addition to the softened condition of the os and cervix, the lower uterine segment may be distinguished in many cases. The finger may detect softened, elastic tissue just above the cervix, the body of the uterus swelling out above it as the body of a jug bulges sharply above its neck. It is often necessary to examine with one finger in the vagina and another in the rectum, to obtain this sign distinctly. This is Hegar's sign and can be found at the third or fourth month.

Cases will come to the notice of practitioners of experience where the reputation and happiness of the patient may depend upon the physician's diagnosis. In such cases the greatest caution must be exercised; the physician must give no statement which can be misconstrued. He will do well to satisfy himself with a statement of what he actually finds after a careful examination. He may then state that such symptoms and conditions sometimes accompany pregnancy, but that an absolute diagnosis at the moment of speaking is impossible.

CHAPTER VII.

THE HYGIENE OF PREGNANCY.

The care of the pregnant woman should begin from the time when her condition is first suspected. Fortunately for her, that which is best for her, if pregnant, is also proper care if she be not pregnant, but suffering from any condition which may give rise to a supposition of pregnancy. A subject of perhaps the first importance at this time is the patient's dress. It is best to lay aside corsets, or if the patient will not do this, to wear such as have been carefully made to fit the body loosely. Better than corsets are waists of various sorts, to which skirts can be buttoned, and which are so devised as to avoid injurious pressure. The important point is to remove from the abdomen the pressure of the patient's clothing, and the benefit to be derived from this will not be realized until a radical change in the patient's dress is made. If skirts are not attached to a properly constructed waist, they should be supported from the shoulders by suspenders.

Next to the patient's skin should be worn woolen of fine quality and light weight. The so-called combination suits, in which shirt and drawers are virtually one piece, are excellent in this condition. Woolen or silk stockings should be worn, and, if possible, supported without encircling garters. Shoes and slippers should be sufficiently easy to avoid pressure, and if warm clothing is necessary, dresses and wraps may be altered or made so as to keep the patient thoroughly warm while distributing the weight of the garments as evenly as possible, and suspending them from the shoulders. Many of the pressure symptoms from which patients suffer during the early months of pregnancy are more relieved by the adoption of suitable dress than by any other measure.

The first symptom for which the physician will commonly be asked to prescribe is nausea and vomiting. The patient should

be informed that these symptoms are almost the invariable accompaniments of her condition, and that they will grow better as time goes on. Drugs should be used as sparingly as possible, and the case can often be palliated by simple precautions regarding the taking of food. Many patients get on comfortably by taking a breakfast in bed. Others are helped by a cup of soup, or tea, or coffee, hot water, an effervescing drink, champagne, brandy-and-soda, while severe cases require confinement in bed and the most careful feeding, nutritive enemata being especially useful. Slight dilatation of the cervix relieves a considerable number of cases of the vomiting of pregnancy. The finger is the best dilator, or a hard rubber dilator of about the same size. Where endocervicitis is present alterative applications are indicated. A strong solution of silver nitrate, gr. 20 to the $\frac{z}{3}$, has been often advantageous. Creolin or iodine is also useful. Such applications should be followed by a glycerine tampon.

In general, it may be stated that every cause of irritation about the womb should be removed, and this, in many cases, will greatly diminish the nausea and vomiting. It is especially necessary to see that the patient does not suffer from constipation, and her unpleasant sensations will often disappear when this is remedied.

Should these measures, however, not be sufficient, and the patient become anæmic, the aid of drugs should be sought. Oxalate of cerium, or valerianate of cerium, sub-nitrate of bismuth, pancreatin, pepsin, and ingluvin may also be tried. Two and a half, or five grains, of one of the compounds of cerium, frequently repeated, often gives good results. Bismuth may be used in these, and larger doses. The digestive ferments may be given with food, or pre-digested food may be employed. Should this not be sufficient, one drop of tincture of iodine may be given, or creosote, or carbolic acid. Cocaine, or wine of cocoa, will often be successful when all else has failed. Fowler's Solution and tincture of nux vomica may be given in doses of one drop of each. Numberless other remedies have been employed, and each case must be studied and treated upon its own merits. It must be remembered, however, that the local treatment of the uterus, and the

patient and skilful use of small quantities of suitable nourishment, with the digestive ferments, furnishes the most rational method of treating these complications. If the trouble persists, the physician should assure himself that the uterus is not dislocated, especially by some backward displacement. It will often be possible, by using finely carded wool or jute in the form of antisepticized tampons, to restore the uterus to its proper position, and relieve the patient's symptoms. In cases of obstinate vomiting in pregnancy, every remedy should be tried which offers the slightest prospect of success. Among those recently employed is menthol, which may be given in doses of from one to five grains.

The question of the interruption of pregnancy will depend upon the presence or absence of dangerous anæmia in the mother. As our study of the blood progresses, we shall undoubtedly be able to recognize conditions dangerous to mother and child alike, by microscopic examination of the maternal blood; at present, however, the general rule may be stated that whenever the mother is threatened with dangerous anæmia, pregnancy should be interrupted at once. It may be possible, after the uterus has been emptied, to cure an endometritis, or remedy some other condition which has caused the patient's suffering. A repeated pregnancy would then result successfully. In replacing a retroverted pregnant uterus, it will be well to hold it in position by some device other than a stiff pessary. Tampons such as have been already mentioned may be covered with ointment of equal parts of lanolin and cosmoline, to which is added powdered boracic acid, ten grains to the ounce. In hospital practice, an ointment of balsam of Peru, cosmoline, and iodoform may be used to advantage. Warm douches may be very cautiously taken if there be extensive irritation about the uterus, and if the douches can be administered by a thoroughly competent and careful person.

Regarding the further hygiene of pregnancy, it may be stated that moderation is the golden rule. The patient's usual tastes in the matter of food and drink should be consulted and continued. She will do well to avoid fatigue, especially standing and walking for long periods. There should be an abundance of sleep, and

an abundance of fresh air. Lukewarm baths should be taken daily, or if preferred, a sponge-bath of moderately cold water. She should avoid long drives over rough roads, but should frequently take drives of moderate length and over smooth roads. Seasickness should be avoided, and any excitement or over-strain. Very hot churches and theatres, and crowds of any sort should be shunned. At the same time, every care must be taken to make the patient's life during this period one of interest and pleasure. Her natural forebodings should be met by kind encouragement, and books and surroundings which furnish healthful diversion may be amply supplied. There is sufficient evidence that the mother's emotions influence the child powerfully to make it necessary for her to avoid fright, or an outburst of any violent emotion. It should be remembered that the teeth are especially liable to deteriorate during this period, and the services of a dentist may be sought early in pregnancy. The patient should be urged to take moderate exercise in the open air. Her diet should be of the most easily digested and nutritious articles of food. If the patient be found to be lapsing into a condition of mal-nutrition, arsenic, iron, cod-liver oil with hypophosphites, malt and meat extracts may be persistently given. Koumyss, Matzoon, and Mellin's Food will be found useful in such cases.

CHAPTER VIII.

THE ATTITUDE AND LOCATION OF THE FŒTUS; THE DURATION OF PREGNANCY.

At five or six months of pregnancy the fœtus begins to assume a definite position in the uterus, and can be recognized as having a definite relation in situation to the mother. By a natural law of accommodation, an ovoidal body contained in a cylinder naturally turns its long axis parallel to that of the cylinder. This is exemplified in the fact that as the fœtus grows, it assumes a position which, in a majority of cases, brings the head to present at the brim of the pelvis, the breech and feet occupying the fundus of the uterus. The ovoidal shape of the fœtus is the result of a condition of flexion which approximates the limbs and head to the trunk. During the early months of pregnancy the specific gravity of the amnial liquid is so great that the fœtus floats readily about, assuming no definite position; but as it increases in size, its specific gravity exceeds that of the amnial liquid, and hence the heaviest portion of the fœtus tends to sink lowest in the uterus, and this fact, together with the law of accommodation already mentioned, results in the attitude and location of the fœtus. In obstetric phraseology these facts are described under the head of (Fig. 29)

Position and Presentation.—By position is meant the relation which a definite portion of the fœtal body bears to a definite portion of the birth-canal of the mother. By presentation is meant that portion of the fœtus which descends lowest in the birth-canal, and which comes first to the notice of the obstetrician on examination. As we have said, ordinarily the head of the fœtus sinks lowest, and hence presents most frequently. The majority of presentations, then, are head presentations. From the fact that the attitude of the fœtus is that of flexion, it results

that the top of the head or vertex is the portion of the cranium which is most frequently lowest, and hence presents. Thus it happens that the majority of head presentations are vertex presentations. Should the attitude of flexion of the head not exist, but should the head have become extended, the face of the fœtus will be lowest, and hence, while the head will continue to pre-

FIG. 29.

THE USUAL ATTITUDE AND LOCATION OF THE FŒTUS.

sent, the face instead of the vertex will be the portion of the head sinking lowest into the pelvis.

On the other hand, the child may present by the lower extremity of the trunk or breech, and thus the long axis of the fœtal ovoid be brought to correspond with that of the cylindrical birth-canal of the mother. Occasionally, through some failure in the law of accommodation, the fœtus at the moment of labor becomes turned transversely across the birth-canal, and then a

transverse position results. The efforts of the uterus to expel the child thus turned across the birth-canal result in bending the head upon the trunk with a lateral flexion, the shoulder of the child sinking downward, and finally presenting in the birth-canal.

If we enumerate the presentations which may occur, we shall find five: the vertex, the face, the breech, the right and the left shoulder. If we consider the situation which any of these presenting portions may occupy in the mother's pelvis, we shall have the positions and presentations grouped together.

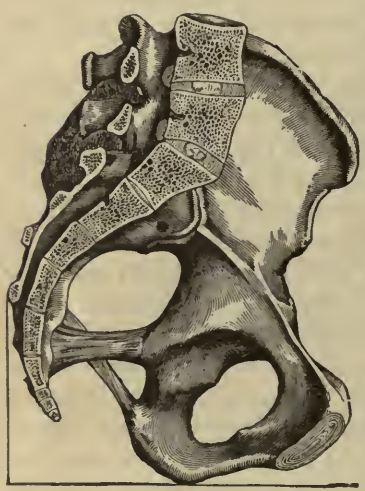
It is of the utmost importance that, in studying obstetric cases, the obstetrician remembers the simple fact that the mother's pelvis has two sides, the right and the left. If the bony pelvis be examined, it will be seen that the points projecting furthest toward the centre of the pelvis from each side are the spines of the ischia; extending obliquely upward and outward from these points there will be seen a slight elevation or ridge on the bony surface of the wall of the pelvis. This slight ridge, like a watershed, divides each side of the pelvis into an anterior and posterior half. The pelvis may then be said to have a left anterior compartment and a right anterior compartment, a left posterior compartment and a right posterior compartment. It only remains to locate the fœtus in one of these four compartments to complete what is technically described as a presentation and position (Fig. 30).

It must be remembered, however, that more important than the especial compartment in the pelvis occupied by the presenting part is the question as to which side of the abdomen the back of the fœtus occupies. In fact, the more rational and modern view makes but two positions: If the back of the child be toward the left side of the mother's pelvis, it is the first position; if the back of the child be toward the right side of the mother's pelvis, it is the second position. When the mechanism of labor is considered, it will readily be seen how this simple division of positions accounts for the phenomena of labor. In the majority of cases the back of the child lies upon the left side of the mother's abdomen, the vertex presenting at the entrance

to the pelvis, and turned in its left anterior compartment. The resulting position and presentation is a left occipito-anterior, and this will be found in more than three-fourths of all cases.

The Duration of Pregnancy is usually two hundred and eighty days. Instances where pregnancy is prolonged for ten months and more are not rare. The cause for the termination of pregnancy has not been clearly demonstrated; but it is most probably the fact that the fœtus can no longer be adequately nourished by the mother. The accumulation in the mother's blood of irritating compounds derived from the processes of fœtal nourishment causes an increased excitability to reflex stimuli. As the fœtus grows, its movements become more vigorous, until the uterus is roused to contraction, and labor results. Rhythmic contractions of the uterus continue during pregnancy, and furnish a sign of pregnancy. They assist in bringing the long axis of the fœtus to coincide with that of the uterus.

Fig. 30.



Lateral Surface of the Pelvis.

In estimating the duration of pregnancy it is best to avoid fixing an especial date, especially with primiparæ. From ten days to two weeks' variation from a calculated date is not unusual. It is customary to reckon from the last day of menstruation, and a simple rule of calculation may be stated as follows:

Count backward three months from the last day of menstruation, and add one year and seven days to the date thus reached. In questioning patients to ascertain the date of last menstruation, the answer elicited will usually refer to the date of the beginning of menstruation, instead of the end, the day desired.

CHAPTER IX.

NORMAL LABOR; THE HEAD PRESENTING.

By labor is understood that process of contraction of the uterus and abdominal muscles which results in the extrusion of the fœtus. It may be commonly divided into three stages; the first, the stage extending from the beginning of expulsive uterine contraction until the birth-canal is fully dilated; the second, the interval occupied by the extrusion of the fœtus; the third, the time required for the delivery of the membranes and placenta.

The characteristics of the first period of labor vary in different individuals in first and subsequent labors. Intermittent uterine contractions occur frequently during pregnancy, and have much to do with accommodating the fœtus to the birth-canal. The beginning of a first labor is usually characterized by an intensification of these wave-like uterine contractions, occupying a varying number of hours. Thus a patient may be in this stage of labor for one or two days before active pains begin. As the name indicates, uterine contractions or labor pains are attended by suffering. Nerve fibres in the walls of the uterus are compressed by the contractions of the uterine muscle, and nerve trunks lying along the brim of the pelvis are also subject to contusion. The stage of intermittent uterine contraction is marked by the dilatation of the os uteri and the gradual obliteration of the cervix. When this process is completed, the membranes commonly rupture, and the actual expulsion of the child begins.

The diagnosis of labor often requires perception and judgment on the part of the physician. He will frequently be called to primagravidæ who imagine themselves in labor because abdominal pain is experienced. Acute indigestion, muscular rheumatism of the walls of the abdomen, intercostal neuralgia, and an ex-

aggerated nervous condition may all give rise to the sensation of abdominal pain. The practitioner can best satisfy himself as to the presence or absence of genuine labor pains by placing his patient in a comfortable position upon a bed or couch, and having her clothing so arranged that his hand can rest upon the abdomen. He will then appreciate the frequency and vigor of uterine contractions, and after a short time of observation can generally determine whether labor has actually commenced or not.

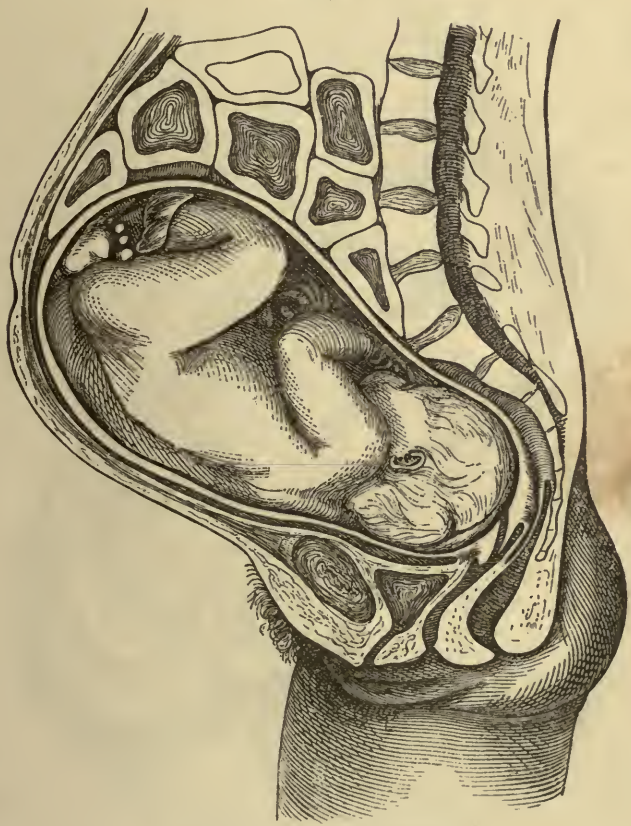
The arrival of the physician, especially if he be a stranger, will not infrequently cause the pains of the first stages of labor to cease for a short time. Tact should be used in approaching a parturient patient for the first time, and the physician will do well not to enter her room until his coming has been announced and a few moments have elapsed. During the second stage of labor uterine contraction will usually go on without interruption.

As labor proceeds, the sensations of pain which at first are diffused through the abdomen will commence in the back, extending along the sides of the abdomen to the supra-pubic region. Although intermittent, they will increase in frequency and severity until, the membranes having ruptured, they become later in labor almost continuous. Positive information regarding the exact stage of a labor can be obtained by internal examination only. In multigravidæ, experience enables a patient to estimate with greater accuracy the exact stage at which the practitioner is summoned. A vaginal discharge of blood-stained mucus is usually a symptom of the dilatation of the cervix, and the beginning of actual labor.

The mechanism of labor in head-presentations consists of the adaptation of the head to the brim of the mother's pelvis, the descent of the head and body of the child into the cavity of the pelvis, the rotation of the child as a whole toward the anterior surface of the mother's body, and, finally, its expulsion. During the later weeks of pregnancy, the intermittent uterine contractions to which reference has (Fig. 31) been made, aided by the elasticity of tissues previously distended will generally result in the descent of

the presenting part into the cavity of the pelvis in multigravidæ. In primagravidæ, however, at the commencement of labor the head will probably be found at the brim of the pelvis, resting

FIG. 31.

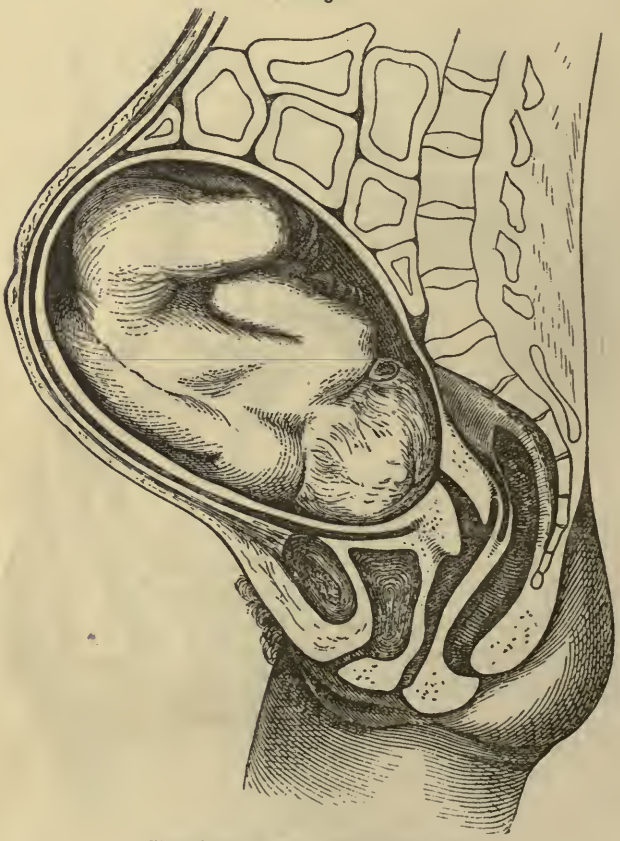


THE FŒTUS IN A PRIMAGRAVIDA.

against its upper edge (Fig. 32). The movement of accommodation by which the head enters the pelvis will consist in adapting the diameters of the fœtal head to those of the pelvis. The head en-

tering obliquely in the majority of cases, the vertex being at the left anterior half of the pelvis, the chin and face of the child will point toward the right posterior portion. It will be remembered

FIG. 32.



THE FŒTUS IN A MULTIGRAVIDA.

that the oblique diameters of the pelvic brim in the living patient measure four and three-quarters inches, twelve centimetres. The occipito-frontal diameter of the head measures also four and three-

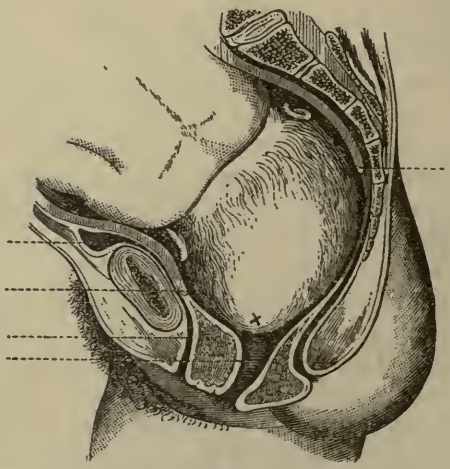
quarters inches, or twelve centimetres. By relaxing the iliopsoas muscles the oblique diameters of the pelvis are capable of slight increase, sufficient to enable them to accommodate the occipito-frontal diameter of the head. These muscles may be relaxed by flexing the patient's thighs upon the abdomen, and this simple manoeuvre will often assist in the descent of the head in a lingering labor.

Should, however, the head be large for the pelvis, it may become necessary to substitute for the occipito-frontal a smaller diameter. The fœtal head is placed upon the trunk, like a lever across its fulcrum, the long end of the lever being the distance from the chin to the foramen magnum. The tendency shown by the human head to drop forward upon the breast, as exemplified in adults as well as in infants, illustrates the fact that the preponderance of weight is in front of the centre of gravity. This movement of complete flexion substitutes for the occipito-frontal diameter the sub-occipito-bregmatic, which averages nine and five-tenths centimetres, or three and three-fourths inches. In the opposite oblique diameter, the left, will be found one of the transverse diameters of the fœtal head. Thus, when the occipito-frontal diameter occupies the right oblique diameter of the pelvic brim, the bi parietal will be in the left oblique diameter. When perfect flexion has occurred with some descent, the bi-temporal will be found in the left oblique diameter. Both of the transverse diameters of the head are sufficiently small to be easily accommodated in the oblique diameters of the pelvic brim. The head having been perfectly flexed, descends gradually through the pelvic brim into the cavity of the pelvis (Fig. 33). The back of the child remaining directed toward the left side of the mother, the trunk descends as the head precedes it, the bis-acromial diameter of the trunk, which measures four and three-quarter inches, or twelve centimetres engaging in the left oblique diameter of the pelvic brim.

When the fœtus has descended sufficiently to fairly enter the pelvic cavity, the membranes have commonly ruptured, the amniotic liquid escapes, and the exact position of the head can

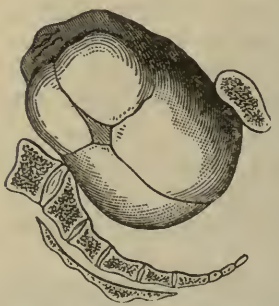
readily be determined upon examination. In the first position, a left occipito-anterior, the sagittal suture will be found occupying the right oblique diameter of the pelvis (Fig. 34) Toward the mother's right side, and a little posterior to the centre of the pelvic cavity, can be felt the anterior fontanelle. This landmark is not obliterated by the pressure which the fœtal head undergoes, and it may be readily distinguished by its size, and by the fact that out from it run four bony lines. These are the sagittal, the fronto-parietal of each side, and the suture between the two frontal bones. On the contrary, the posterior fontanelle is ordinarily obliterated by the pressure exercised by the walls of the pelvis upon the fœtal head, the bones sliding under each other in such a manner as to fill up the interval and leave simply a point of convergence of three sutures, namely, the sagittal and the two branches of the lambdoid. In head presentations a swelling forms on that portion of the head which is not pressed upon during labor. It results from infiltration of the scalp with bloody serum. In vertex presentations with normal rotation, it is found on the upper angle of the

Fig. 33.



The Descent of the Fœtus in Left Occipito-Anterior Labor.
x. The caput succedaneum.

Fig. 34.

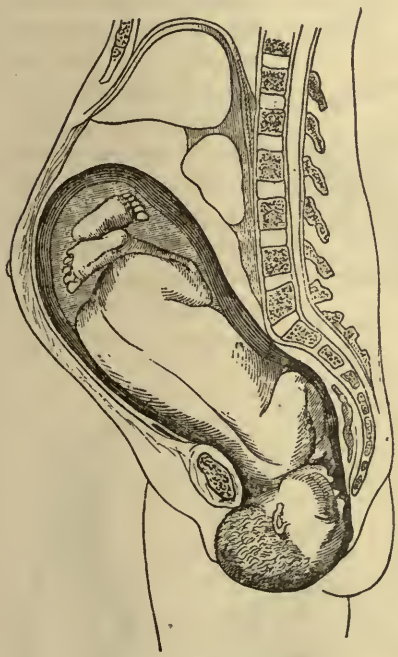


The Head Engaging in the Pelvic Brim.

parietal bone, opposite the presenting point; in left occipito-anterior, on the upper angle of the right parietal bone. It is called the caput succedaneum.

The physician, in his examination at this stage of labor, will find this point of convergence (the smaller, posterior fontanelle) upon the left side of the mother's pelvis, and toward its anterior surface. He will be able to distinguish the sagittal suture extending toward the right and posteriorly, and unless the tissues are firm and resisting, he will also be able to find the anterior fontanelle.

FIG. 35.



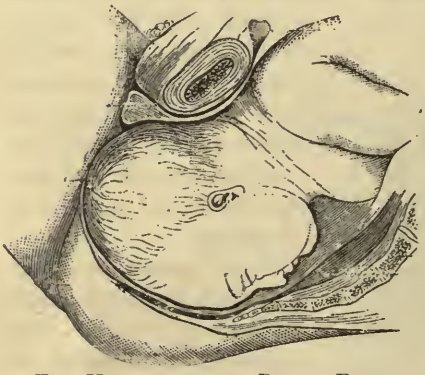
DESCENT AND ROTATION.

Labor proceeding, a phenomenon of rotation occurs as the head descends. By rotation, we understand the turning of the head upon the pelvic floor so that its antero-posterior diameter is parallel with that of the pelvic outlet (Fig. 35). It will be remembered that the only pelvic diameter at the outlet large enough to permit the expulsion of the head is the antero-posterior, which may be reinforced by the bending backward of the coccyx at its articulation upon the sacrum. Thus, a diameter of from twelve to fifteen centimetres, or four and three-fourths to over five inches may be obtained. The anterior turning or rotation of the head brings the vertex beneath the pubic joint, the occipito-frontal diameter resting upon the antero-posterior diameter of the pelvic outlet. The vertex being forced strongly

beneath the pubes, the neck pivots upon the sub-pubic ligament (Figs. 36 and 37).

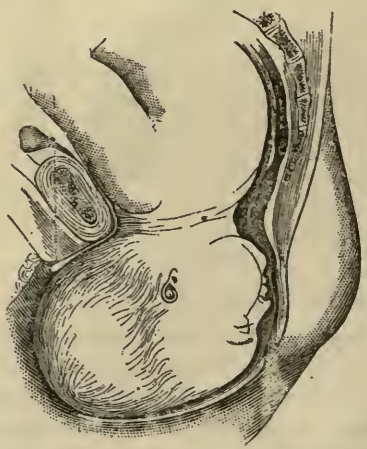
Under the force of uterine contractions the coccyx is bent backward, and the forehead and face of the child are forced over the pelvic floor and perineum by a movement of extension. The trunk meantime follows the head with a corresponding rotation. The bis-acromial diameter having entered the pelvis in the left oblique diameter, the trunk descends, and the right shoulder of the child turning toward the pubic joint is first forced downward, emerging beneath the joint with a mechanism similar to that which the occiput has already executed. The lower shoulder is then extruded by a process similar to the extension of the face and chin, and the trunk and limbs of the child follow. The fact that the head rotates and emerges before the shoulders causes the vertex to turn toward the left thigh of the mother as soon as the head is born. There is no diameter of the trunk of the fœtal body, except the bis-acromial, sufficiently large to occasion delay in the mechanism of labor,

Fig. 36.



The Head upon the Pelvic Floor.

Fig. 37.

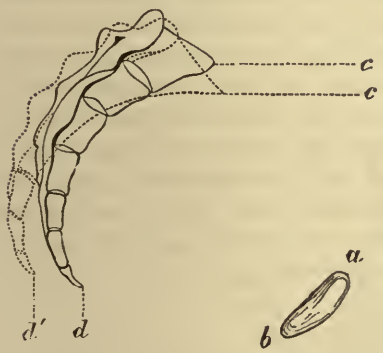


Beginning Expulsion of the Head.

and the head and shoulders born, only a mal-formation in mother or child will occasion delay (Fig. 38).

The characteristics of the second or expulsive stage of labor are strong contractions of the uterus, supplemented by those of the abdominal muscles, with fixation of the diaphragm and contraction of such of the muscles of the trunk as are necessary for this phenomenon. At the moment when the membranes rupture, there occurs a discharge of the amniotic liquid, although more or less discharge of blood-streaked mucus has been going on during the first stage. At the intervals between the uterine contractions, a slight pause occurs, during which the patient, if fatigued, often lapses into a condition of partial stupor or sleep. The surface of the body is frequently covered with slight perspiration, the face is flushed, and the entire organism gives evidence of the great muscular activity which is going on. The complaint of pain increases as contractions become more violent, until the pain seems unendurable. Occasionally a condition of temporary delirium or mania supervenes, which is of short duration. The pulse of the patient, although quicker than usual, is firm and strong, and shares in the vigor of the muscular system.

FIG. 38.



RETROCESSION OF COCCYX.

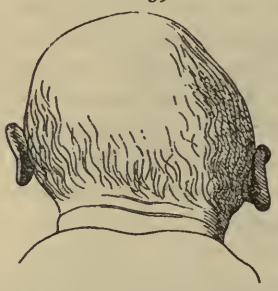
a, *b*, pubes. *c*, *d*, curve of sacrum and coccyx before retrocession. *c*, *d'* after retrocession.

During the early stages of labor the patient will naturally assume such a posture as is calculated to bring the head well into the pelvis, thus facilitating birth. She will frequently walk about the room, assume a semi-recumbent position, and often kneel at the side of the bed, her head resting upon her arms which are folded on the body. After the rupture of the membranes she

instinctively assumes a recumbent position, often turning from side to side if her sufferings be severe.

The mechanism of labor when the vertex is directed toward the right side of the mother's pelvis and anteriorly, corresponds to that already described, with the simple reversal of direction in rotation. Thus the head and trunk, in the first instance rotating from left to right toward the middle line of the body, in the second instance, turn from right to left toward the centre. While the former is much more frequent, the latter is not to be considered as an abnormal labor. Practically, the distinction between a normal and an abnormal labor, the head presenting, will depend upon two factors: presence or absence of flexion, and the anterior or posterior rotation of the occiput (Fig. 39).

FIG. 39.



HEAD BORN IN RIGHT OCCIPITO-ANTERIOR LABOR.

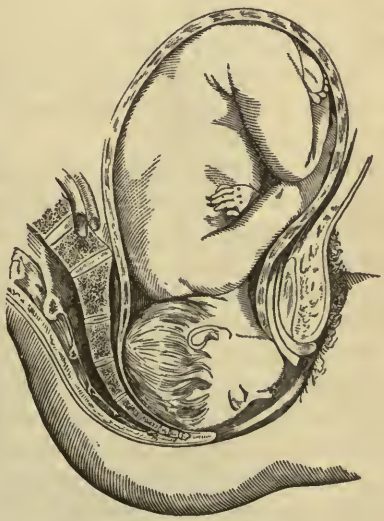
CHAPTER X.

ABNORMALITIES OF LABOR, THE HEAD PRESENTING.

A NOT infrequent abnormality of labor, the head presenting, is the failure of the vertex or occiput to rotate anteriorly as the head descends. Many writers describe this phenomenon under the head of occipito-posterior positions, but the simpler and more rational explanation is to view them as cases of defective rotation, and not as separate positions and mechanisms.

The physician will find early in labor the vertex presenting, but not turned so plainly in front as is usually the case. The course of labor is more prolonged, and greater suffering is sometimes experienced. As the head descends, the vertex, instead of turning to the front, remains directed posteriorly, and finally the head reaches the pelvic floor with the occiput near one or other of the sacro-iliac joints. If the expulsive force of the uterus and the abdominal muscles be normally great, and the resistance of the pelvic floor be considerable, the head being flexed, the occiput will turn, in nearly nine-tenths of all cases, toward the front, and the expulsion of the child will be completed as usual. Should, however, the resistance of the pelvic floor be deficient,

FIG. 40.



THE OCCIPUT IN THE HOLLOW OF THE SACRUM.

and the expulsive forces be lacking, flexion being incomplete, the head may turn into the hollow of the sacrum and remain lodged in this position. The conditions necessary for anterior rotation of the occiput are, sufficient expulsive force, the resistance of the pelvic floor and the maintenance of a condition of flexion on the part of the head. When any of these factors is deficient, the impaction of the head may result (Fig. 40).

Another abnormality of labor in head presentations occurs when, from any cause, the antero-posterior diameter of the pelvic brim is so much lessened as to encroach upon the oblique diameters, and prevent the head from entering in one of them as is usual. The head, in attempting to enter, will then turn transversely to the entrance of the pelvis, the occiput upon one side, the forehead upon the other, and if expulsive efforts continue, the head will be flexed laterally upon the spinal column, and one or other of the parietal bones will slip downward and forward, presenting at the entrance to the pelvis. This is known as a Parietal-bone presentation.

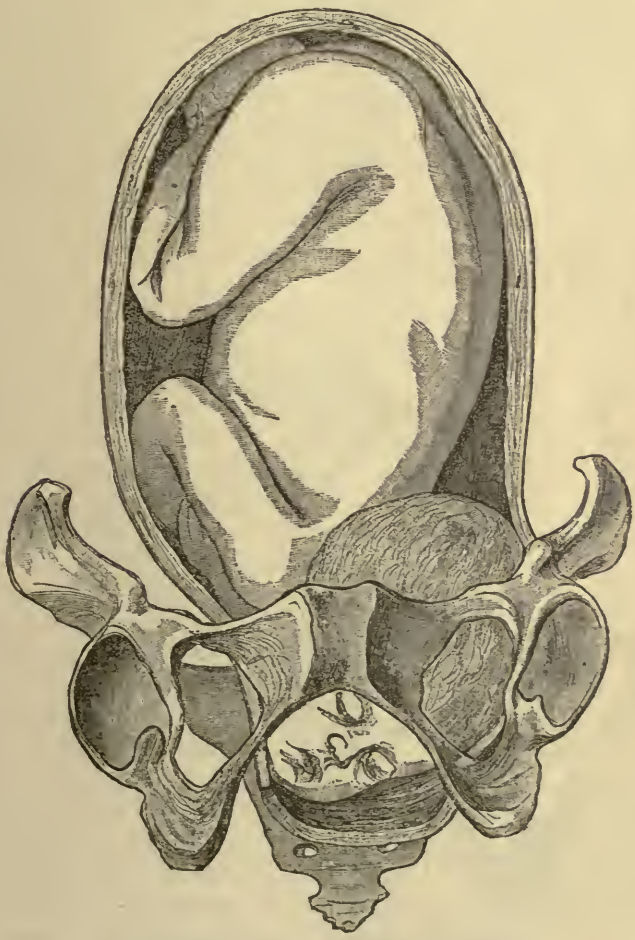
A most important abnormality in head presentations is that by which the head becomes extended instead of flexed. Should partial extension occur, what is known as a Brow presentation may result, the lower portion of the forehead and the superciliary ridges becoming the presenting part. Should, however, complete extension be present, a Face presentation will result.

Face Presentation.—This abnormality of the presentation of the head is definitely named in accordance with the portion of the head which is considered as the presenting part. Thus the forehead may be taken, and the presentation be spoken of as a Fronto anterior presentation. Others select the chin, and speak of Mento-anterior presentations.

The occurrence of either will be best understood by following a case of Left occipito anterior, or first occipital presentation, in which the head, instead of becoming flexed, is completely extended. As the occiput rises upon the left side of the mother's pelvis, the forehead descends, and, sweeping through an arc of a circle in the right oblique diameter of the pelvis, it lodges in the

left anterior compartment of the pelvis, formerly occupied by the occiput. The chin sinks deeply into the pelvis pointing toward

FIG. 41.



FACE PRESENTATION; LEFT-FRONTO-ANTERIOR.

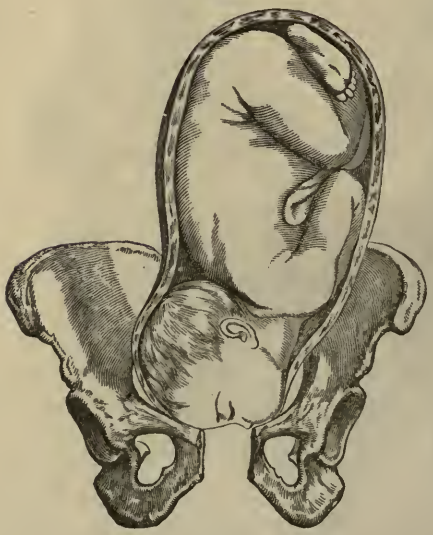
the mother's right side and posteriorly, the back of the child re-

maining as usual toward the left side of the mother, and turned slightly in front (Fig. 41).

The forehead may be taken as the presenting part, and the presentation and position will then be called Left-fronto-anterior. This may also be styled the first position in a Face presentation. Should a similar mechanism be executed upon the right side of the pelvis, a Face presentation in the second position would result. Others, however, prefer to take the chin as the cardinal point presenting in these cases, and to name the position, Mento-anterior or posterior. Thus, the position just described as Left-fronto-anterior might be considered a Right-mento-posterior, and similarly, the chin may occupy any one of the four compartments of the pelvis (Fig. 42).

The mechanism of a face presentation will depend upon the degree of extension which is present. In a case of Left-fronto-anterior, if extension be completed, the trachelo-bregmatic diameter of the fœtal head will engage in the right oblique of the pelvis. In the left oblique diameter will be found the bi-temporal diameter of the head. Each of these diameters will be remembered as less than four inches, or ten centimetres in extent, and hence, is not sufficiently great to cause delay in rotation. The head descending with perfect extension, the chin should rotate anteriorly, and engage beneath

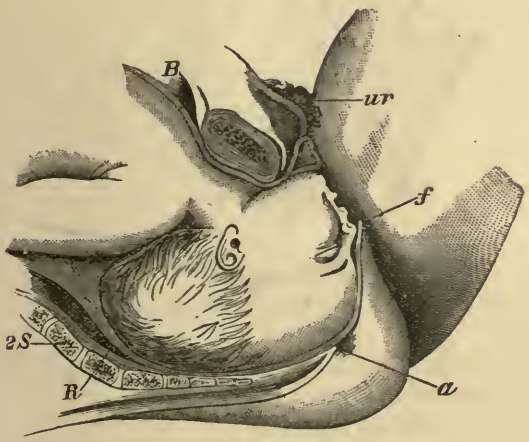
Fig. 42.



Right-Fronto-Anterior.

the pubic joint. In this way, first the thickness of the head from foramen magnum to the anterior fontanelle, and then the thickness of the child's trunk above the shoulders are received in the antero-posterior diameter of the pelvic brim, the chin pivoting beneath the pubes: by a motion of flexion the occiput is brought down over the concave surface of the sacrum, the coccyx and the distended pelvic floor, finally emerging by the retrocession of the coccyx at the sacro-coccygeal joint. If perfect extension does not exist as the head descends, its maximum diameter,

FIG. 43.



MECHANISM OF FACE PRESENTATION.

B. The bladder.
2 S. Second Sacral Vertebra.
R. Rectum.
a. Anus.
f. Fourchette.
ur. Urethra.

or the occipito-mental, will be brought in relation with the diameters of the pelvic brim, and impaction will result and labor cease (Fig. 43).

A most dangerous complication in face presentation is the turning of the chin posteriorly into the hollow of the sacrum. The antero-posterior diameter of the pelvis must then receive not only the thickness of the head from the occipital region to the anterior

fontanelle, but also the thickness of the chest of the child; the combined mass cannot enter the pelvis, and hence impaction of

FIG. 44.

EXPULSION OF THE HEAD IN FACE PRESENTATION.

the fœtus results. The factors necessary for the production of a normal mechanism in face presentations are sufficient expulsive force in the uterus and muscles of the abdomen; adequate resistance of the pelvic floor, and the maintenance of extension. A position of the head between extension and flexion in these cases must result in impaction (Figs. 44 and 45).

Cases occur not infrequently in which the head is born last, but this will be considered under breech presentation.

FIG. 45.

HEAD BORN IN FACE PRESENTATION.

Occipito-anterior Presentation. Face Presentation. Brow Presentation. Occipito-posterior Presentation.

Supplementary Diagnosis of the course of labor, from the shape of the skull of the new-born child. (Olshausen.)

CHAPTER XI.

THE TREATMENT OF NORMAL LABOR.

The treatment of the first stage of labor requires the exercise of judgment regarding the administration of drugs which might seem naturally indicated in this condition. When the physician finds the patient actually in the first stage of labor, if she be under the charge of a competent nurse, he will do well to disturb her as little as possible. He should first scrub his hands thoroughly with soap and water; then rinse them; then scrub them in bichloride solution, 1 to 1000. A thorough vaginal examination will then assure him that the time for active interference has not arrived. There are no active means by which the dilatation of the birth-canal can be hastened, which are not fraught with danger, and which should not be reserved for urgent cases. The complaint of pain, which will so strongly tempt a physician to prescribe narcotics, is the most distressing feature he has to encounter. The patient, however, should be diverted as much as possible from a consideration of her sufferings, while caution should be exercised that her strength does not become exhausted. She should be encouraged in first labors to remain up and about as long as possible, assuming any position most comfortable to herself. The nurse should see to it that the bladder and rectum are completely empty, and if any suspicion of a previous inflammation about the birth-canal exists, the patient should receive a vaginal douche of bichloride of mercury, one to five thousand. Among the many drugs which have been given to mitigate the suffering of the first stage of labor, chloral and antipyrine are most deserving of confidence. The first may be given in doses of fifteen grains, repeated hourly, until three or four doses have been taken. It may be conveniently administered by rectal injection, as the stomach of the patient is often sensitive at

this time. Antipyrine may be given in doses of two and a half grains each, either dissolved in water, or in wafer or capsule. The writer's experience has shown him that larger doses than these of antipyrine result in delaying labor, while small doses frequently give the patient considerable comfort. The drug may be repeated three or four times at intervals of one or two hours.

In abnormal cases of labor where it is feared that exhaustion may result from delay in the first stage, it is well to give the patient frequent hot douches. These should be rendered antiseptic by some substance which does not destroy the natural smoothness and slipperiness of the mucous membrane. A one per cent. solution of creolin will be found best adapted for this purpose. Carbolic acid, one per cent., or a very dilute solution of bichloride of mercury, one to ten thousand, may also be employed.

In hospital practice, where the antecedents of patients are not known, it is well to give a preliminary douche of green soap and creolin, sufficiently strong to contain two per cent. of the antiseptic, before labor. The writer's experience in the Philadelphia Hospital has convinced him of the decided advantage to be gained by such an injection, either before or during the first stage of labor. With hospital patients a full bath, either in a tub, or if the patient's sufferings will not permit, by a sponge, should be invariably given; the external genital organs should be washed in bichloride solution, one to two thousand, and if the membranes have ruptured, an antiseptic napkin should be worn until the physician's arrival. Should this stage be prolonged, care must be taken that the patient receives some easily digested nourishment. Stimulants should be avoided unless exhaustion is actually threatened.

The physician should discriminate regarding the existence of delay in the first stage of labor from the inhibitory action of the sensation of pain. Thus, labor may begin, and after a short time the pains die away, the patient complaining of severe suffering which has gone to the point of nervous exhaustion. It will be well then to give the patient a full dose of some anodyne, putting

her perfectly to sleep for a few hours, when labor may go on successfully. An injection of morphia, one-eighth of a grain, with atropia one two-hundredth, will usually be found best for this purpose.

When, however, the membranes rupture and the actual expulsion of the fœtus begins, the part which the physician is to play becomes a more active one. The patient should then lie upon her left side upon a bed suitably prepared by the nurse, a pillow or blanket roll between her knees, and her clothing should be so arranged that it may readily be changed after the birth of the child without great disturbance or fatigue. The physician should then examine the patient thoroughly to satisfy himself of the position and presentation. He should have at hand a basin containing a solution of bi-chloride of mercury one to two thousand, in which pieces of absorbent cotton, or old linen, are immersed; he needs also to have available, Squibb's Fluid Extract of Ergot, brandy or whiskey, a hypodermic syringe in good order, tincture of strophanthus, tincture of digitalis, and aromatic spirits of ammonia.

The ligature for the cord should have been previously prepared from silk or stout thread thoroughly antisepticized. The physician should have within easy reach a stethoscope, a pair of scissors suitable for cutting the cord, a small blunt-pointed bistoury, and a pair of hæmostatic forceps. Beneath the edge of the bed should be a receptacle into which soiled pieces of cotton or linen may be thrown, and also a suitable vessel for receiving the placenta.

The question of anæsthesia during normal labor is one admitting of difference of opinion and discussion, but the writer is convinced of the value of an anæsthetic given to a mild grade of anæsthesia, in expediting labor, facilitating delivery, and reducing the tendency to laceration of the perineum. It is his custom to use chloroform, and a mask composed of canton flannel stretched upon a wire frame. This flannel may be readily removed and washed, and hence cleanliness in this respect can be easily observed.

As labor proceeds, the patient's requests for relief from suffer-

ing may be met by allowing a few drops of chloroform to fall upon the mask, and having her inhale sufficient to appreciate the odor without being affected by it. Should, however, it become evident that the patient's pains are so severe as to threaten exhaustion, it will be well to encourage her to inhale sufficient of the anæsthetic to give her brief periods of repose between the pains. A sleep for three or four minutes thus obtained will often change a lingering to a speedily successful labor, and prevent the application of forceps.

When the head descends upon the pelvic floor, the physician must choose that form of support to the perineum which, in his judgment, best reduces the risks of laceration. The writer has no hesitation in stating his belief that by far the most efficient method of delivery is that taught so long in the Vienna Obstetric Clinics, and sometimes denominated "The Vienna Method." It consists in placing the right hand broadly extended upon the perineum, the curve of the posterior commissure being received in the space between the thumb and index finger; the left hand is placed between the patient's thighs, and as the head emerges, the fingers of the left hand in a semi-flexed condition grasp the vertex, holding it strongly upward beneath the pubic joint. Should the patient threaten to expel the child suddenly, either hand may be placed over the vulva, the other pressing upon it, and the strength of both arms is instantly available to check the too rapid progress of labor. As the head descends, the physician cleanses the perineum by means of the cotton or linen immersed in the antiseptic solution, dropping these pieces into the waste receptacle beneath the edge of the bed. At the moment of delivery, he requests that the patient inhale the anæsthetic deeply to complete the transient anæsthesia. Directing or maintaining the flexion of the head by the left hand, with the right he presses the head backward until a pain has ceased, and then at a favorable opportunity, having tested the elasticity of the perineum by allowing it to move back and forth under the right hand as the head descends, he slips it back over the head, allowing the head to be born between the pains.

The nurse should have ready a solution of boracic acid and glycerine, with small bits of old linen, and as soon as the head is born, the eyes and mouth of the child should be cleansed with this material. During the brief pause which occurs between the expulsion of the head and the shoulders, the patient should be allowed to rouse partially from the anæsthesia, although the vigilance of the physician should be in no way relaxed. His left hand should grasp the neck of the child, bending the child's trunk by a lateral flexion so that the presenting shoulder, usually the lower, is prevented from ploughing downward into the perineum. The right hand should still support the pelvic floor, and thus the delivery of the shoulders be managed upon the same principles applied to the birth of the head. The shoulders born, the anæsthetic should be entirely suspended, and upon the expulsion of the child the nurse or physician should place a hand upon the fundus of the uterus, while the child is allowed to lie upon its right side until the pulsation of the cord has ceased. A temporary ligature may then be thrown about the cord three fingers' breadth from the umbilicus.

Fig. 46.

Episiotomy.

The dotted line on the patient's right shows the line of incision. The dark oval shows the amount of dilatation gained by episiotomy on both sides.

If the child is asphyxiated, and haste is imperative, the cord may be clamped by the hæmostatic forceps, and cut without ligation. The child, when separated from the mother, is wrapped by the nurse, preferably in a woolen blanket, and when its respiration has been observed to be normal,

Fig. 47.

Episiotomy Knife Devised by the Writer.

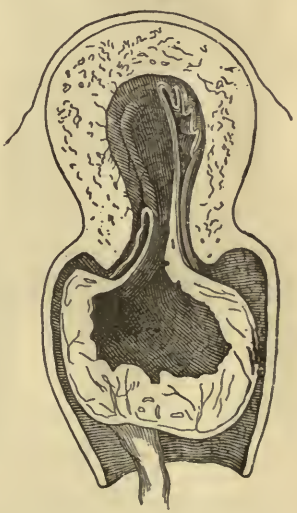
it is placed aside until the time for its first bath (Figs. 46 and 47). In cases of excessive distention of the perineum, serious rupture may often be prevented by the simple procedure of episiotomy. This is effected by introducing a blunt-pointed bistoury, or a blade of a pair of blunt-pointed scissors, between the head and the edge of the vulva at the junction of the upper two-thirds with the lower third. The extent of such an incision will depend upon the degree of distention; but, ordinarily speaking, from an inch to an inch and a half may be incised without danger. The blade of the knife should be turned up against the edge of the vulva at the occurrence of a pain, when the tissues will separate, and the perineum can often be observed to retract to a remarkable extent over the presenting part. After delivery, these incisions should be stitched with fine catgut, plentifully powdered with boracic acid, aristol or iodoform, when, as a rule, they heal promptly. The *serre-fine* has been used in place of the suture with success.

CHAPTER XII.

THE THIRD STAGE OF LABOR.

WITHOUT narrating the many theories which have been formed regarding the separation and expulsion of the placenta, it seems in the present state of our knowledge to be the fact that the placenta separates from the wall of the uterus by the intervention of a clot (Fig. 48). It is expelled from the uterus by the contractions of that organ, and especially by those of the abdominal muscles. The time normally occupied for the accomplishment of this is sufficient, first, to allow partial separation and the formation of a clot to occur; and, second, to give the patient sufficient interval in which to recover consciousness, if she has been anæsthetized, and to regain control of the diaphragm and abdominal muscles. When labor is accomplished without putting the patient entirely to sleep at the moment of birth, the placenta may follow within ten or fifteen minutes after the expulsion of the child. When, however, the patient is exhausted or has been anæsthetized, from half an hour to an hour may elapse before uterine contractions bring about the expulsion of the placenta (Fig. 48).

FIG. 48.

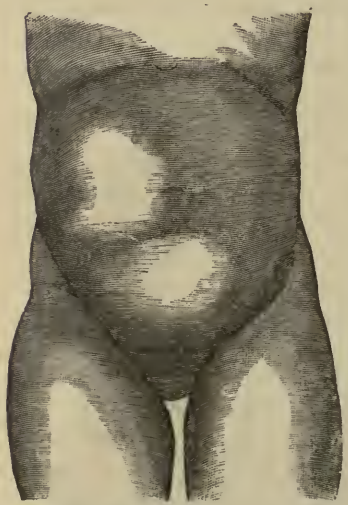


THE PLACENTA AND MEMBRANES, After the expulsion of the fœtus.

The question as to whether active interference is demanded must be determined by the presence or absence of hemorrhage

and the consistence of the uterus as felt through the abdominal wall. If the uterus remains moderately firm, and there be no hemorrhage, the practitioner should wait, if the labor has been normal, until the patient has had from twenty minutes to half an hour's rest, and is able to make voluntary expulsive efforts. The left hand should then be placed upon the fundus of the uterus, and that organ roused to contract by gentle friction with accompanying pressure in the axis of the pelvis. The right hand of the physician, having been freshly cleansed and antisepticized, should examine to ascertain the descent of the placenta. Usually a few vigorous contractions of the uterus and abdominal muscles will bring the edge of the placenta at the vulva within easy grasp by the physician. He should then fold it together with the thumb and fingers, and by a gentle rotary motion it will be felt to slip easily away, the membranes following it in a twisted cord. The nurse should hold a suitable receptacle between the patient's thighs, and thus the placenta may be transferred without exposure and with but little soiling of the bed, and reserved for future examination (Figs. 50 and 51).

Fig. 49.



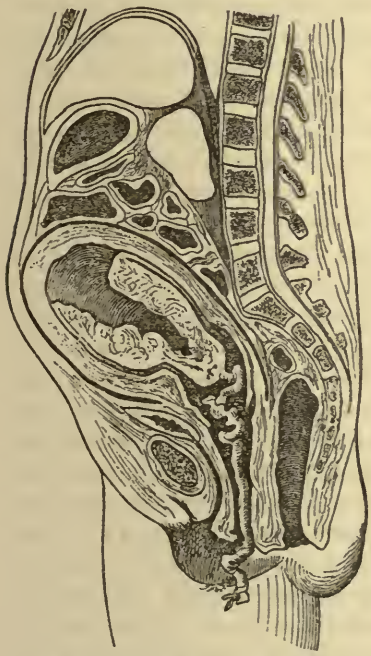
The Abdomen after the Fœtus is Born.

The placenta in the uterus.

The attention of the physician should next be directed to the firmness or laxity of the uterus. In healthy, young primiparæ, the mechanism of the closure of the uterine sinuses is amply sufficient to guard against hemorrhage; but where repeated labors have weakened the uterus, or where it has been relaxed by protracted or abnormal labors, it is the part of caution to administer a teaspoonful of the Fluid Extract of Er-

got. In some cases five grains of quinine will act more efficiently than ergot. In severe cases where the effect of the drug must be obtained at once, it may be injected into the walls of the abdomen in doses of thirty minims. The patient should now be left in charge of the nurse to be properly cleansed.

FIG. 50.



THE EXPULSION OF THE PLACENTA, FŒTAL SURFACE FIRST.

FIG. 51.

THE PLACENTA IN THE LOWER UTERINE SEGMENT.

The physician will have had opportunities during the progress of labor to be aware of the presence or absence of lacerations of the pelvic floor; if he is not satisfied as to their existence and their extent, he will do well, before leaving his patient, to examine thoroughly, and should sufficient laceration be found, and

the condition of the patient permit, it should be closed at once. The question as to just what extent of median laceration of the perineum demands suture is a difficult one to answer. The sanitary regulations of some of the countries where midwives practice extensively under license require them to summon a physician to close a laceration of more than one-half or three-fourths of an inch. In hospital practice it is safe to say that all lacerations except those of the posterior commissure should be closed by sutures. Abrasions of the mucous membrane or stellate tears in the mucous membrane of the vagina should be heavily powdered with a suitable antiseptic substance. In hospital practice, iodoform is best; in private practice where the odor of iodoform is so objectionable, powdered boracic acid or aristol may be employed to advantage. It will not infrequently be found that instead of a laceration of the perineum, the mucous membrane of the vagina may have been dissected up from the sub-mucous tissue for two or three inches at one side. If it can be done without too much suffering and inconvenience, it is well to close such a laceration.

The immediate closure of perineal injuries of slight extent is comparatively a simple matter. Curved needles, needle-holder and a pair of dissecting forceps, and a good quality of antisepticized silk will usually be sufficient. Silver wire is preferred by some, and the over and over stitch with catgut by others, but, as a rule, the average practitioner will do better with silk than with any other material. The principle of closure consists in simply bringing together lacerated surfaces, remembering that the stitch should go sufficiently deep to bring the wound together from the bottom. As to the time for the performance of this slight operation, if the patient and the physician be exhausted, if the light be poor, and the conditions unfavorable for closing a lacerated perineum, where labor has occurred during the night, it is well to wait four or eight or even twelve hours until the patient has become somewhat rested, and the physician can perform his duty under favorable circumstances. A great advantage in immediate closure is found in the fact that the tissues are less sensitive to pain than

usual, but a mild degree of anæsthesia will relieve the patient of suffering if the operation be deferred.

It is almost needless to say that the strictest antiseptic precautions should be observed in all cases of labor. After a normal labor the patient should be given one vaginal douche of bi-chloride of mercury, one to five thousand. Further douches are superfluous and often injurious, unless complications arise. If, however, the patient has been lacerated and stitches have been inserted, she should have two and possibly three vaginal douches, in twenty-four hours, of bi-chloride of mercury one to five or eight thousand, creolin one per cent., carbolic acid two per cent., thymol one to two thousand, or a saturated solution of boracic acid. After the douche, the parts should be powdered well with iodoform or boracic acid.

After attending to the mother, the physician should examine the placenta and the membranes to assure himself that no part of them has been left within the uterus. He may also note any peculiarity about the placenta in form, size, weight, or the presence or absence of calcareous or fatty degeneration which may be present. The child should also claim his attention, and he may, at his leisure, grasping the cord at the umbilicus with the thumb and finger of the right hand and cutting it freshly at the ligature, strip or squeeze the cord from the umbilicus outward. A cord which is not rich in Wharton's jelly may not need stripping, but in all cases where the cord is large this procedure should be attempted. A convenient and useful method of dressing the cord is to powder it with salicylic acid one part, and starch five. It is then enveloped in absorbent cotton and placed upon the child's body, pressing gently against the trunk on one side of the umbilicus. A knit or flannel binder is then applied after the bath of the child, and the cord is thus protected from violence.

CHAPTER XIII.

THE TREATMENT OF ABNORMAL LABORS, THE HEAD PRESENTING.

The treatment of abnormal labors in head presentations must be directed to secure the conditions requisite for a normal mechanism of labor. These conditions are sufficient expulsive force on the side of the mother, the resistance of the pelvic floor, and the flexed position of the head.

As regards failure of the mother's expulsive forces the most common example is lingering labor from weak pains. Delay from this cause is most often seen in poorly developed, neurotic primiparæ, in old primiparæ where the birth canal is not easily dilated, and in multiparæ where the uterine and abdominal muscles have been so often distended that they have lost their elasticity and contractile power. The cessation of expulsive efforts, *before the membranes rupture*, is attended with little danger to the mother and none to the child. *After the membranes rupture*, both are in danger from protracted labor. The complete cessation of expulsive efforts after rupture of the membranes should give rise to the suspicion that the fœtus and the birth canal, in a head presentation, are disproportionate. It cannot be too strongly urged that only a preliminary examination by pelvimetry, palpation and auscultation can enable an obstetrician to rationally conduct a case of even normal labor. When by such examination the pelvis has been found normal, the position and presentation are occipito-anterior, either left or right, and the head has engaged favorably, thus showing a normal proportion in the size of the fœtus and birth canal, failure of the expulsive forces before the membranes rupture is to be treated by anodynes and sedatives to secure rest; by emptying bladder and rectum; by small quantities of easily digested food, and by allowing the patient to assume such postures as conduce most to her comfort. Occasionally toughness of the

membranes delays labor, when the obstetrician must rupture them; but as a rule the membranes should be left to rupture spontaneously.

During the second stage of labor in these cases, failure of expulsive efforts is to be treated first by posture By turning the patient on that side to which the presenting part is pointing, and flexing her thighs, descent and rotation will be facilitated. In addition, the uterine and abdominal muscles may be stimulated by friction. This is best done by commencing to rub the abdomen and gently knead the uterus when a pain begins, increasing the rate and vigor of manipulation as the pain advances. As the pain reaches its acme, pressure may be made in the axis of the pelvis and continued until uterine contraction abates. Drugs which experience has shown may be safely employed to stimulate expulsive efforts are the diffusible stimulants, as alcohol, tea and coffee, and quinine. The last is advantageously given in capsules containing three grains of quinine and one or two grains of scale pepsin, a combination which does not usually excite the nausea so often seen at this time. The mother's expulsive efforts may be stimulated and encouraged by her cöoperation, in fixing the diaphragm and bringing the necessary expulsive muscles into play, by pulling upon a sheet tied at the foot of the bed, or grasping the hand of an attendant. Whenever the sensation of pain is so acute as to inhibit expulsive muscular action, an anæsthetic in small doses will allow the reflex mechanism of labor to proceed successfully. At the beginning of a pain the patient should be allowed to smell of the anæsthetic; at the height of the pain she may experience its effects sufficiently to enable her to sleep for a few minutes when the pain has passed. In this way action and repose alternate, and progress continues.

An abnormal position of the head will be usually discovered when the membranes rupture, as the obstetrician should then thoroughly examine the patient. It can best be remedied by the insertion of the antisepticized hand, aided by the administration of an anæsthetic. In face presentation extension is to be sought. If the physician detects, early in labor, that the occiput

is turned posteriorly, he will do well, before the membranes rupture, to place the patient upon the side toward which the occiput is pointing. By so doing, the fundus of the uterus is allowed to incline toward that side, and the rotation of the presenting part is favored by bringing the fœtus more perfectly into the axis of the birth-canal. As the head descends the hand may be used to push up the forehead and favor flexion. The expulsive forces of the mother should be conserved by the administration of tonics or stimulants, and should these forces fail the forceps is indicated. It must be remembered that labor, when the head turns posteriorly, is usually longer and more painful than normally, but it should also be borne in mind that nearly nine tenths of these cases terminate spontaneously with an anterior rotation of the occiput.

When the occiput turns into the hollow of the sacrum, great caution is needed in attempting to complete delivery. A choice lies between the forceps and craniotomy, and should the child have perished, the latter, in skilful hands, is the better of the two procedures. The method of applying the forceps in these cases will be described under the general consideration of the use of this instrument.

The treatment of brow presentations consists in the endeavor with the antisepticized hand to convert a brow into an occipital presentation, with craniotomy should impaction and fœtal death occur. Version in the early stages of labor, when dilatation is complete, is also indicated in brow presentation, when the pelvis is normal and the fœtus proportionate in size.

Face presentations must be treated by securing as complete extension as possible, by retaining the membranes unruptured to the latest moment, and occasionally, by the use of the forceps. When the head is turned transversely at the brim of the pelvis, causing the presentation of a parietal bone, the case demands most cautious treatment, and will be considered under the head of The Treatment of Labor in Contracted Pelves.

CHAPTER XIV.

THE FORCEPS.

A FREQUENT complication in labor, when the head is presenting, is failure of the mother's expulsive power, necessitating instrumental delivery. In the early days of obstetric science, such cases invariably terminated by the death of the child, and its mutilation and extraction by sharp hooks. When, however, the idea of blunting these hooks and converting them into a harmless tractor arose, the forceps was invented.

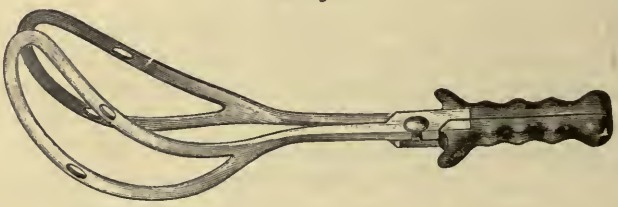
Its model was doubtless suggested by the shape of the hand about to grasp a round object like the head. It consists of two blades, named in accordance with the sides of the pelvis nearest which they lie, the left and the right. Each blade is composed of an expanded portion for grasping the head, an intermediate portion bearing some device for fastening the two blades together, and two handles, one at the extremity of each blade. The expanded portion for grasping the head resembles the hand rendered concave by flexion. This concavity gives to this portion of the forceps blade a curve called the Cephalic Curve, because it is intended to favor the approximation of the instrument to the head. From the tip of the expanded or head portion of the forceps blade to the handle the entire blade describes a curve somewhat resembling the axis of the pelvis. This is called the Pelvic Curve of the forceps.

In the centre of the cephalic portion of the forceps blade is an ovoid aperture called the Fenestra of the blade. The device for fastening the forceps blades together, called the lock, consists in some instruments of a large screw with thumb-piece by which the upper can be fastened firmly to the lower blade; in others of a button-like knob placed upon the lower blade, while a niche in the upper blade receives the stem of the button when the blades

are brought together; the lock may also consist of a loosely fitting joint formed by a niche in the lower blade receiving a loosely fitting ledge upon the upper. The lock most frequently in use is the last, which is exemplified in the Simpson forceps. The material of which the forceps is made is tempered steel, plated with nickle; the handles are often of hard rubber, darkly stained wood, and, occasionally, of metal entirely, the purpose of the last being to avoid a corrugation which in wooden handles may give lodgment to septic material.

Forceps are divided commonly into long and short, the long being, as the name implies, several inches greater in length than the short forceps. The various modifications of this instrument

FIG. 52.



DAVIS FORCEPS, PERFORATED FOR AXIS TRACTION TAPES.

are so many that only those most in use will be mentioned, and especially those whose merits have been proven by personal experience. Forceps may be divided into two classes as constructed with direct reference to the manner of application. For example, the Simpson forceps, one of the most commonly used, is constructed to be applied to the sides of the pelvis without regard to the rotated or unrotated condition of the head. On the other hand, the Davis forceps was shaped to be applied to the sides of the child's head. Various other instruments are intermediate in construction, but each is made with some reference to this manner of application (Fig. 52).

The indications for the use of the forceps are, danger to the life of the mother or child, or both, arising through delay in labor. Occasionally, in precipitate labor, the head may be so

grasped and its progress controlled by the forceps as to render the birth a normal one so far as the rate at which the child is expelled is concerned. While the forceps has powers as a lever, compressor and rotator, yet these are secondary and accidental, and its chief and important function is that of a tractor.

The conditions under which the forceps may be safely applied are a vertex presentation, very rarely a presentation of the breech or face. The size of the child should be proportionate to that of the birth-canal of the mother, the folly of attempting to drag a large head through a small pelvis being self-evident. The birth-canal must be dilated, and the fœtal membranes must have ruptured.

The dangers attending the use of forceps are laceration of the maternal tissues, laceration of the child's scalp, compression and injury of the child's brain, and the increased risk of septic infection accompanying the use of instruments. Although this instrument, improperly used, is one of the most dangerous to mother and child, yet its proper employment, under antiseptic precautions, does not increase the mortality and morbidity of labor beyond a very slight extent.

The first and simplest complication of labor for which the forceps may be employed occurs when the vertex presents; rotation has occurred; the head has descended to the pelvic floor, but the mother's expulsive forces failing, the life of the child is threatened through asphyxia, and the mother's tissues are in danger through pressure, while her strength is well-nigh exhausted. The application of the forceps under such circumstances is known as the Low-application or Low-forceps-operation, because the head is resting upon the pelvic floor when the instrument is applied. Danger to the fœtus in such a case is recognized by weakness of the fœtal heart, with rapid beating, and sometimes a much diminished frequency in cardiac action. Danger to the mother in such a case can be diagnosticated by her exhausted condition, rise in her temperature, rapidity of her pulse-rate, and a dry and swollen condition of the birth-canal. A careful physician, however, will not wait until the conditions mentioned are present in the birth-canal, but will interfere when the other indications exist.

To apply the forceps, the patient is placed upon her back across a bed, her hips brought to the edge of the bed, and her feet in chairs. An antiseptic douche should be given before the application of the instrument, and the physician should be sure that the bladder and rectum are empty. In primiparæ an anæsthetic should always be administered; in multiparæ it is sometimes possible to avoid anæsthetizing the patient. The physician should prepare his instrument by dipping it in hot water, washing it carefully in soap and hot water, rinsing it thoroughly; the forceps should then be placed conveniently in a pitcher of a hot antiseptic solution, creolin two per cent., carbolic acid two and a half per cent., being convenient. The instrument may be lubricated by slightly smearing the outer surface with some antiseptic ointment, or with carbolized oil. The physician should then place himself directly opposite his patient, so that he can appreciate any deviation from the central line of her body. The left blade of the forceps, or lower blade is to be inserted first; the hands having been thoroughly cleansed and antisepticized, the fingers of the right hand should be introduced into the vagina between the head and the wall of the birth canal; grasping the left blade of the instrument at its centre with the left hand, the physician gently inserts the left blade guided by the fingers of the right hand. (Fig. 53). To facilitate introduction, the left blade should be held with its handle parallel with Poupart's ligament of the right side; the thumb of the right hand gently pushes against the posterior surface of the cephalic portion of the blade, the instrument gliding gently between the head and the fingers of the right hand (Fig. 54). When properly applied, the forceps blade slips in almost imperceptibly; the handle of the blade will tend naturally to drop toward the floor, and should be held by an assistant. The fingers of the left hand having next been introduced as a guard, the right blade should be grasped in the right hand of the physician, and inserted toward the right side of the mother's pelvis. If it fits easily over the head, an effort may then be made to lock the blades by allowing the right or upper blade to fit down upon the left, and the parts of whatever lock may be present to adapt

themselves to each other. If the forceps will not lock easily, the blades should be slightly shifted with great gentleness until they lock easily.

Locking having been accomplished, the physician may then by gentle traction try to move the head. A very moderate force, such as that exercised by the fore-arms of the operator only, is all that it is safe to use. Traction should imitate so far as possible uterine contractions and the normal expulsive efforts of the mother. If the mother be conscious, she should be urged to "bear down," and traction by the forceps should be simultaneous with her effort. If she be anæsthetized, traction may be made every five or ten minutes as the case demands. In simple cases such as that under consideration, the force should be directed first slightly downward, then directly outward, and last, upward. By this means the occiput will be brought out from beneath the pubic joint; traction directly outward should then follow until the head begins to distend the perineum. By this means the occiput will have emerged from beneath the pubic joint, and will be distending the vulva. Traction should then be almost directly upwards, when the head will be delivered over the perineum.

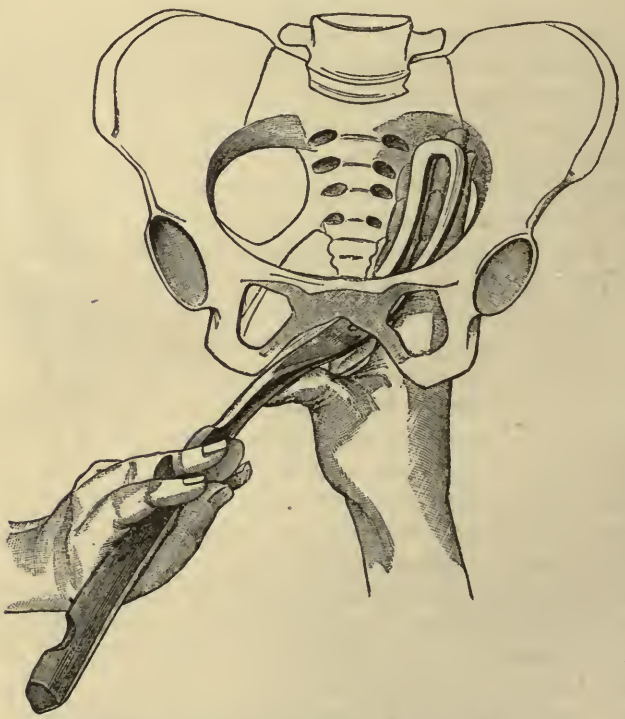
Fig. 53.

The Left Hand Grasping the Left Forceps Blade.

In this way the natural mechanism of labor is imitated, and laceration of the perineum through downward pressure of the head may often be prevented. The simple procedure of Episiotomy,

to which reference has already been made, is especially well adapted to such cases. After the delivery of the head, the shoulders will usually follow if the uterus be roused to contraction by friction. After delivery, the patient should receive a thorough douche of bi-chloride of mercury one to five thousand,

FIG. 54.



THE INTRODUCTION OF THE LEFT BLADE COMPLETED.

and any slight lacerations should be thoroughly dusted with an antiseptic powder. Although lacerations very frequently occur when the forceps is used, yet in many cases a laceration is prevented through the better control afforded the practitioner by his instrument (Fig. 55).

In other countries, the patient is frequently placed upon the side during forceps delivery, although the position upon the back is the favorite one in America. The low-forceps-operation, or use of the instrument when the head is upon the pelvic floor, is a

FIG. 55.

PROTECTION OF THE PERINEUM IN FORCEPS DELIVERY.
Patient upon the left side.

comparatively simple and safe procedure. When, however, the head has not rotated, and especially if the head be situated at the brim of the pelvis, the application of the forceps is a difficult and dangerous manipulation.

CHAPTER XV.

THE APPLICATION OF THE FORCEPS AT THE BRIM OF THE PELVIS: AXIS TRACTION.

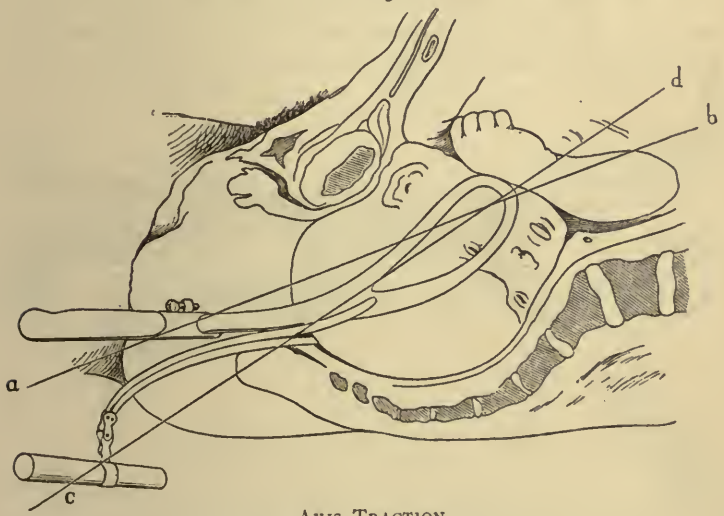
Any one who has ever introduced the instrument, both blades being in position and locked, into the pelvis of a skeleton so high that he could grasp a head situated at the brim of the pelvis, must have observed that when traction was begun with the forceps so applied, the result was either failure to cause the head to descend, or its extraction with great difficulty. If the cause for such difficulty was sought, it was found that when the forceps was turned strongly forward, the tips of the cephalic portions of the blades impinged against the walls of the pelvis, and progress became impossible. In a living patient, the lining membrane of the birth-canal would have been badly lacerated by such an effort. If, however, a piece of tape be passed through the fenestræ of the forceps, and when introduced to the brim of the pelvis, traction be made downward and backward by pulling upon the tape, this difficulty is avoided, and a comparatively easy traction will result. Remembering that the direction of the axis of the birth-canal is downward and backward until the pelvic floor is reached, when it is deflected upward and forward, it will be seen that traction in this direction may be appropriately termed axis traction (Fig. 56).

Any forceps fitted with a device for performing this manœuvre, namely, pulling downward and backward when the forceps is applied at the brim of the pelvis, is an axis-traction-forceps. The more elaborate of these instruments possess metal tractors hinged upon the cephalic portion of the blade, which are not detachable. The simpler axis-traction-forceps have some convenient device for the accomplishment of this purpose by which traction is gen-

erally made with tape or bandage, the whole being easily attached or disconnected. Of the first class are the elaborate instruments of Tarnier, Simpson and Breus, and their modifications. The latter form of instrument is well represented by the tape attachment devised for the forceps by Poullet, which may be applied to any ordinary pair.

If we consider the best means of promoting flexion in cases in which rotation is deficient, we shall see that traction in the axis

FIG. 56.



AXIS TRACTION.

a b. Traction with the ordinary forceps.
c d. Traction with the axis traction forceps.

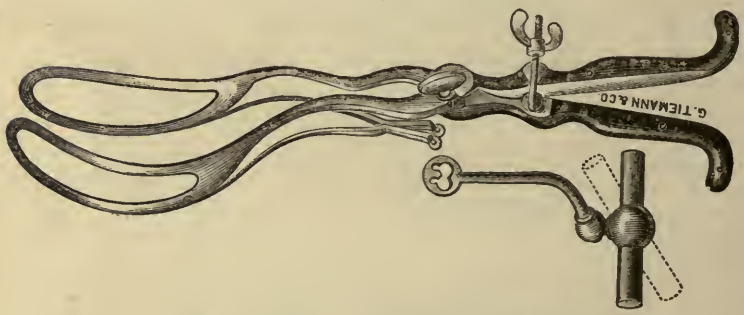
of the pelvis is among the most valued of resources. The axis-traction-forceps then is especially valuable in this complication, and hence it is that posterior rotations of the occiput and defective rotations are often best treated by axis-traction.

An equal advantage in face presentations is often gained by the use of such an instrument in the ability to secure perfect extension. Before proceeding to consider the application of the forceps at

the brim of the pelvis, we may be allowed to repeat that the case already described is the simplest condition calling for the use of this instrument, namely, failure in expulsive force, the occiput presenting and having rotated anteriorly, the head resting upon the pelvic floor, the child being proportionate in size to the pelvis; the function of the forceps is simply to imitate the mechanism of the last portion of the second stage of labor. The dangers attending its use in such a case are undue compression of the fœtal head and laceration of the perineum and pelvic floor.

We next proceed to the more serious conditions requiring the use of the instrument, namely, the expulsive forces of the mother failing before the head has descended to the pelvic floor while

FIG. 57.



LUSK'S TARNIER'S AXIS-TRACTION FORCEPS.

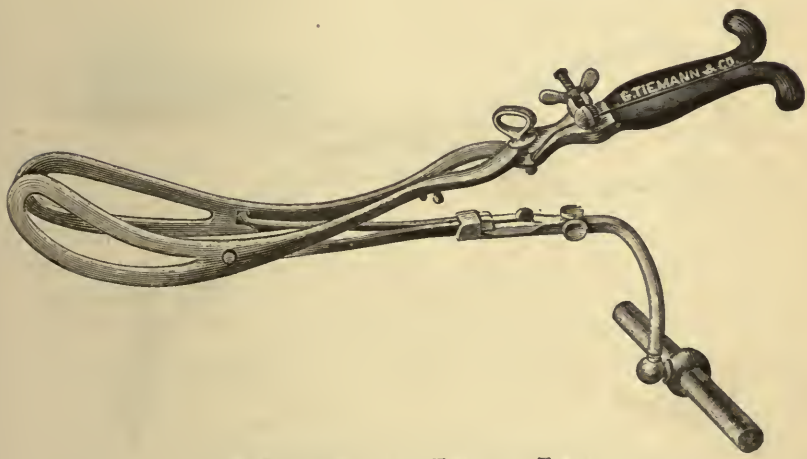
rotation is as yet incomplete, and in cases in which, often-times, the child is not proportionate in size to the mother's pelvis. The use of forceps in face presentation and when the child presents by the breech, is comparatively rare.

It not infrequently happens that the mother's strength becomes exhausted when the head has engaged at the brim of the pelvis and before descent and rotation have occurred. In such cases the dangers of exhaustion and fœtal death are greater than in the cases just described, as are the risks of injury to the mother by the instrument itself.

The two classes of instruments already described were designed

with a special reference to these cases. Thus the Tarnier axis-traction-forceps and the Simpson long-axis-traction-forceps represent two theories of application (Fig. 57). In the first, the operator endeavors to apply the forceps accurately to the sides of the head; the instrument is firmly secured in its grasp of the fœtal head, traction is made in the axis of the pelvis, and the instrument and the head are allowed to rotate together (Fig. 58). In the use of the second instrument mentioned, the forceps is applied to the sides of the pelvis and in the pelvic axis, grasping the head as it conveniently

Fig. 58.



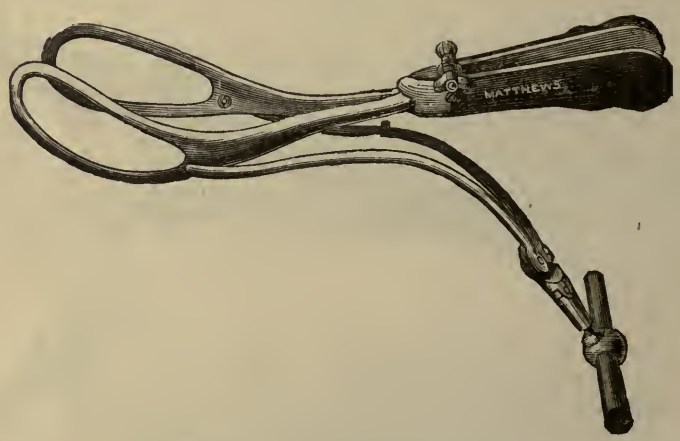
Tarnier's Latest Axis-Traction Forceps.

can. Intermittent traction is then made in imitation of labor pains and between the tractions the blades are slightly separated, and the head is allowed to rotate by degrees until, by the time the pelvic floor is reached, it has fitted itself gradually to the instrument (Fig. 59).

The first method of application is the more difficult; the second is comparatively easy, but requires discrimination and skill in favoring the rotation of the head. We have employed for some

time in axis traction the ordinary Simpson forceps to which we have adapted the tape attachment of Poullet. A brief description of the method of adapting these tapes is as follows: The blade of the forceps is made in its cephalic extremity a little heavier than ordinary, the fenestra of the blade measures four and one-half inches in length; two and one-half inches from the cephalic end an aperture is made in each limb of the blade surrounding the fenestra one-quarter of an inch in length, one-eighth of an inch in width; this aperture is so bevelled as to present no sharp surface; through it is passed a piece of strong linen tape one-half inch in width, inserted from within outward through one aper-

FIG. 59.



SIMPSON'S AXIS-TRACTION FORCEPS.

ture, and then from without inward through the other; each piece of tape is one yard long, or eighteen inches after it has been doubled by passing through the forceps blade; the tapes are received in a traction bar consisting of a straight portion eight inches long curving downward a distance of four inches, and terminating in a rotary traction handle; just before the traction bar curves downward, it has upon the upper surface a cross piece, two and one-quarter inches long, which has at each end an aper-

ture for making fast the tapes; the end of the traction bar which is nearest the mother has a rim of metal through which the tapes pass to be tied into the apertures; the forceps is applied to the sides of the pelvis in the usual manner, the tape being held along the blade by the obstetrician and the instrument being first introduced on the left side of the mother as is customary; care is taken that the tape rests between the forceps blade and the head of the child; the tapes are then passed through the ring of the traction bar, passing below the locked forceps, and are made secure at the cross piece; to prevent cutting the perineum and posterior wall of the vagina, Sim's speculum or any suitable depressor or guard may be used.

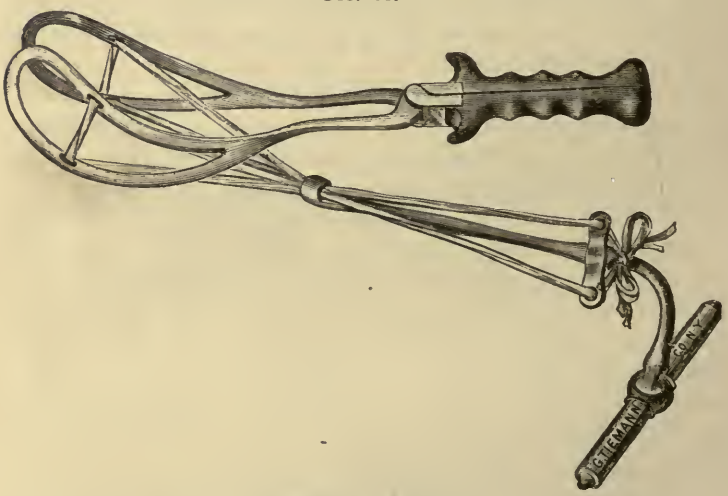
It has been found by experience that a special screw for holding the forceps firmly locked is not necessary; extraction is made with one hand, while with the other the forceps is grasped as usual and easily held and applied to the head; the pull upon the tapes is such as to tend to keep the forceps tightly applied to the head instead of drawing the blades apart. We are accustomed to carry the tape and traction bar with us, using the forceps without them when axis traction is not necessary. The fact that this attachment can be fitted to any forceps with which the practitioner is familiar, its little cost compared with expensive axis-traction instruments, the ease with which it is cleaned and carried in the regular obstetric bag, have made the instrument a very convenient one in our hands (Fig. 60).

The high forceps operation, or the application of the instrument at the brim of the pelvis, is admissible only when the child is proportionate in size to the birth-canal of the mother; when the head has at least partially engaged at the brim of the pelvis; when there exists no obstacle to delivery in the centre of the bony pelvis and at the pelvic floor; when the membranes have ruptured, and, as is the rule in these cases, when mother or child, or both, are in danger from delay.

While it is sometimes possible in the simple or low forceps operation to perform delivery without changing materially the patient's position, in the application of forceps to the head at

the brim of the pelvis, the patient must be brought to the edge of the bed or table, her hips projecting over the edge sufficiently far to enable traction to be made in the axis of the pelvis. An anæsthetic is nearly always indispensable. As in all obstetric operations, the bladder and rectum should be thoroughly emptied, and means should be at hand for promptly resuscitating the child. In selecting an instrument, the average practitioner will do better with one to which he is accustomed than with a strange,

FIG. 60.



SIMPSON'S FORCEPS,
With Poullet Tape Attachment for Axis-Traction.

although possibly superior instrument. The patient being anæsthetized, a thorough examination should be made to determine as far as possible the exact position of the head. If the operator purposes to apply the forceps to the sides of the pelvis, the blades may then be introduced as usual in the pelvic axis, and passed in sufficiently far to grasp the head. If the instrument is selected to fit upon the sides of the head, especial care should be taken to apply and secure it in the proper manner.

With the former, traction should be made downward and backward at intervals resembling as far as possible the contractions of the uterus during labor. Between the tractions the grasp of the forceps should be slightly relaxed to afford the head an opportunity to rotate. As the head descends, especial care should be taken when the pelvic floor is reached to relax the forceps more than in the earlier traction. It will be remembered that it is not until the pelvic floor is reached that rotation occurs, and hence the necessity for allowing the head greater freedom at this time. If the Poullet tapes are used, they can be disconnected from the traction bar after the pelvic floor is reached, and the head delivered as in an ordinary application at the pelvic floor. If the axis-traction-forceps with non-detachable traction bars are used, these bars may be folded up upon the shank of the forceps when no longer in use.

In applying axis-traction forceps to the sides of the head, care should be taken to clamp them sufficiently to secure a firm hold. Traction, however, should be made as in the former case, in the axis of the pelvis toward the median line. The use of the forceps as a rotator is a secondary, and not a primary employment of the instrument. The forceps and head must rotate together when the instrument is applied to the sides of the head; but the rotation must be effected by traction in the axis of the pelvis, and not by forcible rotary movements. Compression and leverage are also secondary functions of the forceps; but the operator should not purposely compress the head to any great extent, nor pry it loose from an impacted position. Only such compression and leverage as are incidental to the securing of a firm grasp and making traction in the axis of the pelvis are admissible.

Research has shown that the diameters of the fœtal head are lessened in some directions, and enlarged in others, by pressure with forceps. If the forceps is so applied that either a transverse or antero-posterior diameter be lessened, the vertical diameter may be slightly increased without serious damage. In normal labor such increase takes place through the projecting of the parietal bones at the sagittal suture, and this may be imitated

during forceps delivery. A physiological pressure upon the fœtal head may be said to be such as would force cerebro-spinal fluid from the ventricular spaces of the brain into those of the cord, and *vice versa*, thus temporarily lessening the volume of one portion of the cerebro-spinal nervous axis at the temporary expense of the other. The writer has observed, after several cases of forceps delivery where the death of the child resulted within a week or ten days, patches of cerebral softening not resembling those occasioned by embolism, but apparently resulting from pressure.

When the head does not engage at the brim of the pelvis, as a rule the forceps should not be applied. Version, or some other obstetric operation, is then indicated. A method of obtaining axis-traction, sometimes useful, consists in passing a piece of tape through the fenestræ of the blades sufficiently long to reach nearly to the floor. The tapes are then tied together while the operator makes traction by the handles; the loop of tape is passed about his feet, and downward pressure in this way reinforces the usual methods of traction.

The Use of the Forceps in Posterior Rotation of the Occiput.—In occipito-posterior positions, it will be remembered that, as a rule, rotation occurs when the head reaches the pelvic floor. To secure this end, however, the expulsive forces of the mother must be good, and the resistance of the pelvic floor be also considerable. Flexion of the head must be present to secure this result. The use of the forceps in these cases is to promote flexion, and aid the descent of the head. For this purpose, axis-traction is desirable. The instrument most appropriate is that of Simpson, or some modification, which leaves the head free to rotate as labor progresses.

When, however, the occiput is turned directly backward into the hollow of the sacrum, axis-traction is not necessary, and delivery can usually be secured by applying the instrument to the sides of the head, and making traction directly outward and slightly downward until the forehead of the child begins to appear beneath the pubic joint. The grasp of the instrument should

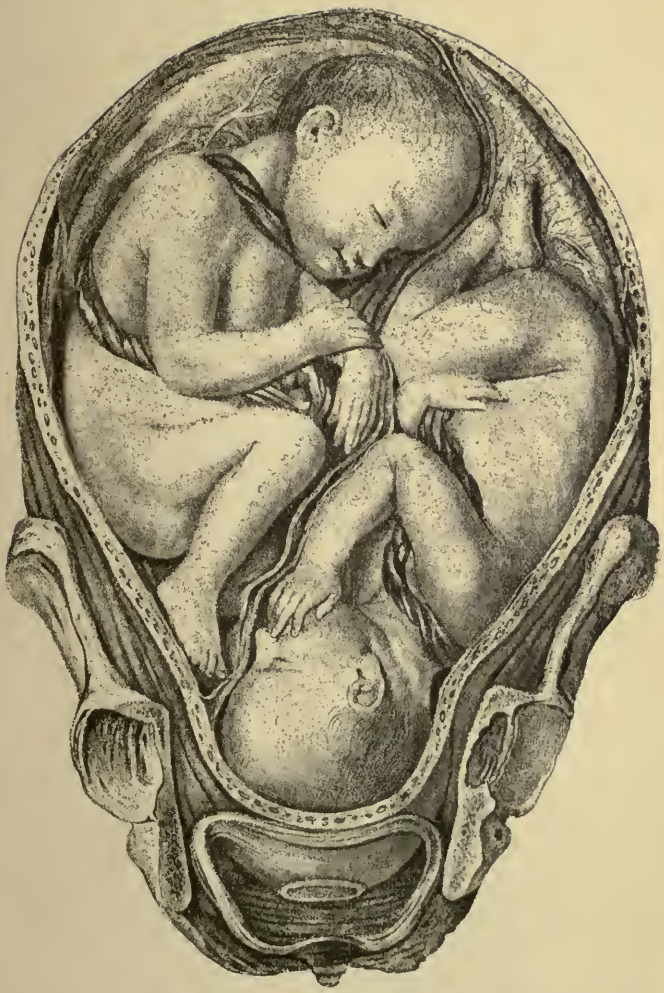
then be relaxed, the handles should be slightly lowered, and a fresh grasp obtained. A movement of flexion should then be performed by the forceps, the handles being slowly raised to allow the occiput to pass over the perineum. In such cases, laceration of the perineum usually occurs, is generally considerable in extent, and sometimes complete.

The Forceps in Face Presentations.—The best authorities agree that the application of the forceps in face presentations is not to be commended. It is true that a narrow-bladed straight instrument has been employed on several occasions successfully, securing perfect extension, and favoring the rotation of the chin anteriorly. As a rule, however, the use of the instrument results in such injury to the child and the mother as to render version a far more desirable expedient.

The Forceps applied to the Breech.—In cases of breech presentation where the progress of labor is slow, it has been found possible to favor descent by applying the forceps in such a way that the trochanter of each side should fit into the fenestra of each blade. If the instrument is applied in any other manner, serious injury may be done through pressure of the tips of the blades upon the abdomen of the child. Traction in the pelvic axis should be made.

Morbidity and Mortality Caused by the Forceps.—When the indications for the use of the forceps are intelligently comprehended, and the instrument is rationally employed with strict antiseptic precautions, its use does not increase the maternal morbidity and mortality of labor, but under other conditions a very considerable increase in both occurs. The injuries most common to the fœtus from the forceps are bruising and laceration of the scalp, fractures of the cranium and face, and injuries to the brain through pressure. It occasionally happens that very extensive laceration of the scalp occurs, followed by sloughing after birth. Fractures of the cranium and bones of the face are rarely fatal of themselves, and are serious in proportion as they are accompanied by injuries to the brain through pressure. Fracture of the jaw rarely occurs and will often recover perfectly

without the application of a splint. Paralysis of the facial nerve by pressure upon the trunk soon after it emerges from its foramen is not uncommon, but is usually temporary in character. Pressure upon the brain may produce limited areas of softening as already described, and even death from extensive injury to the vital centres. Although it has been believed that idiocy is often the result of pressure by forceps, yet proof of this is wanting in the majority of cases, while a causal relation between forceps delivery and epilepsy is also not proven.



Uterus with Twins in cranial and breech presentation (two ova). (Smellie.)

CHAPTER XVI.

LABOR IN BREECH PRESENTATIONS.

A BREECH presentation may be diagnosticated before labor by feeling the fœtal head in the upper portion of the abdomen, by hearing the fœtal heart sounds at or above the umbilicus, by detecting at the brim of the pelvis a body less round and hard than the head, and by mapping out the fœtal limbs. At labor, such a presentation will be suspected when the head cannot be recognized as the presenting part by its hardness and globular outline; a diagnosis can be made with certainty when the thighs of the child can be felt, and their relative position to the trunk be recognized.

The natural course of labor in breech presentation is more prolonged than when the head presents, because the breech is inferior, as a dilator of the birth-canal, to the head, and also because delay is apt to occur in the descent and delivery of the after-coming head. Nature endeavors in these cases to retain the membranes unbroken as long as possible, thus securing thorough dilatation (Fig. 61).

The positions of breech presentation are designated by selecting the posterior surface of the sacrum as the cardinal point upon the fœtus. In the first breech presentation, the back of the fœtus is toward the left side of the mother, the posterior surface of the sacrum being opposite the left ilio-pectineal eminence. The diameter of the fœtal body principally concerned in the mechanism of the engagement and descent of the breech is the bis-trochanteric, extending from one trochanter to the other, measuring three and three quarter inches, or nine and five-tenths centimetres. When labor occurs in the first position, this bis-trochanteric diameter engages in the right oblique of the pelvis.

The body of the child descends into the pelvic cavity, and the anterior hip, in this case the left, rotates forward under the pubes. If the child be small and the birth-canal capacious, the hips may emerge diagonally across the outlet of the pelvis. The body is bent slightly upon itself by lateral flexion as it emerges.

In normal cases the arms of the child remain folded across its breast. The left shoulder of the child engages first under the pubic joint, and pivots beneath the articulation while the right

FIG. 61.

BREECH PRESENTATION, THE LEGS EXTENDED.
First Position.

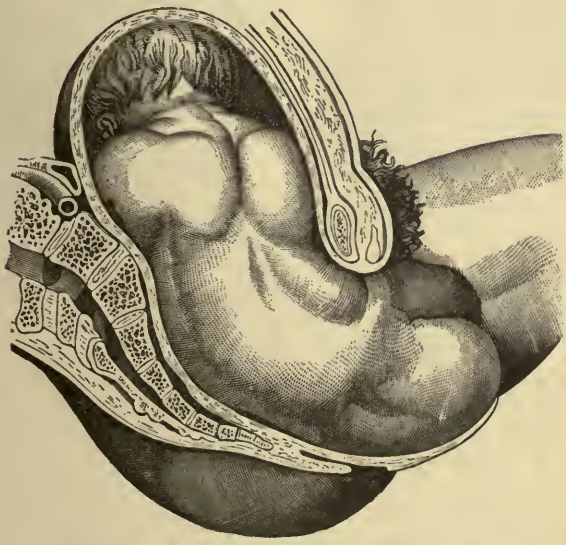
shoulder sweeps over the perineum. The back of the child then turning anteriorly, if flexion be complete, the chin emerges closely approximated to the breast, and the occiput pivots beneath the pubic joint. Flexion continuing, the head passes over the perineum from the chin to the occiput successively by a motion of perfect flexion. When the back of the child rotates posteriorly toward the back of the mother, the chin often pivots

behind the pubic joint, and delivery may take place by expulsion with strong extension (Figs. 62 and 63).

When the back of the child is toward the right side of the mother in the second position of breech presentation, the mechanism is the same, with a reversal in the direction of the rotation.

The treatment of breech presentations requires, so far as possible, very early recognition of the presentation. It is of espe-

FIG. 62.

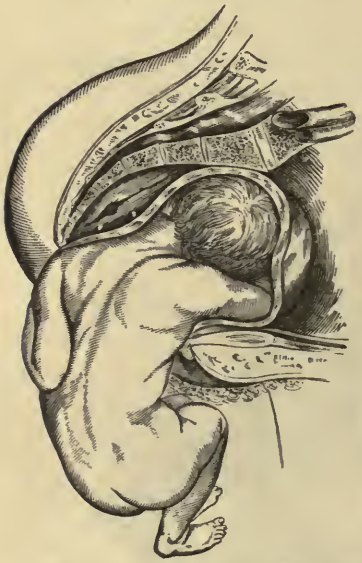


DESCENT OF THE TRUNK, BREECH PRESENTATION.
Second Position.

cial importance whenever the obstetrician detects an abnormal presentation that the membranes be not ruptured until the very last moment. One of the dangers to which the child is exposed in abnormal presentations arises from the defective dilatation of the os and cervix, which contract about the head and neck of the fœtus at the moment of delivery, often causing death by asphyxia. This is especially true in labor with breech presentations, in which

the head, coming last, is exposed to pressure and resistance from an imperfectly dilated birth-canal. The membranes, then, should

Fig. 63.



The Shoulders Emerging, Breech Presentation.
Second Position.

Fig. 64.

Expulsion of the Head in Breech Cases.

be retained until the breech has descended, and oftentimes until the membranes begin to protrude at the vulva (Figs. 64 and 65).

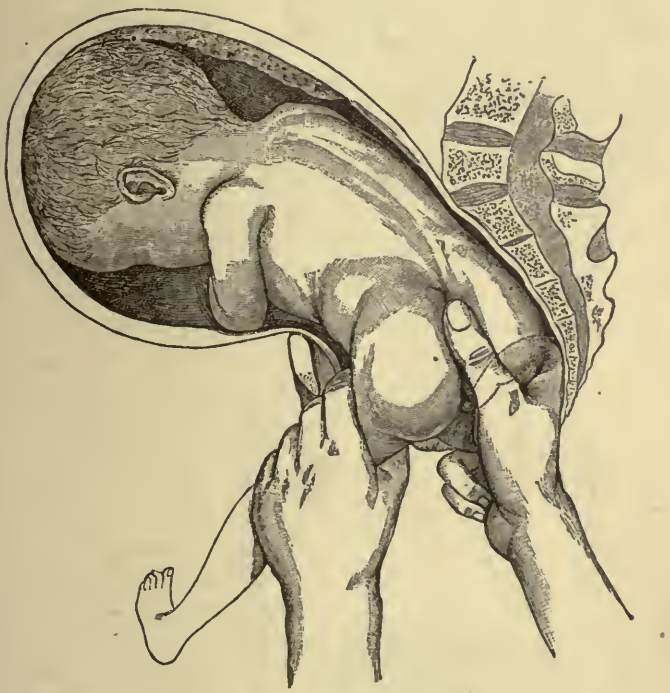
In a simple case of labor with breech presentation, the obstetrician should avoid hastening the descent of the trunk. Traction carelessly made upon the hips and limbs will often cause the ascent of the arms to the sides of the head, seriously com-

Fig. 65.

Head Born in Breech Labor.

plicating its delivery. As the breech emerges, the wedge formed by the breech and flexed thighs will be gradually decomposed, and the limbs will become gradually extended. It occasionally happens that descent of the limbs is present from the beginning of labor, constituting what is often known as a "footling case." As the

FIG. 66.



BRINGING DOWN THE HIPS IN A DELAYED BREECH LABOR.

body of the child descends the physician should support it with his hand, or with a warm towel, standing ready to raise the body of the child toward the mother's abdomen with one hand, while making prompt and energetic pressure over the uterus behind the pubic joint with the other, at the moment when the head emerges.

These two simple manœuvres will result in the prompt expulsion of the head in uncomplicated cases. If an anæsthetic has been used, its administration should be discontinued before the head reaches the pelvic floor, so that the mother's conscious efforts may be solicited at the critical moment when the head is passing (Figs. 66 and 67).

Fig. 67.

Bringing down the Trunk in Breech Cases.

It is well in all breech cases to have at hand the forceps ready for instant use, and also appliances for resuscitating an asphyxiated child. Of the latter, the warm bath accompanied by a fine stream of cold water directed upon the chest, is the best. It is well to have a small English catheter which may be introduced into the trachea, should direct inflation of the lungs be necessary. In the majority of cases an asphyxiated child in whom circulation persists can be resuscitated by placing it in a hot bath, directing a fine stream of cold water

upon its chest and making passive respiratory movements. The application of cold water should be brief, and the stream should be so fine as to resemble a jet of spray. The entrance of air into the fœtal chest can be secured by Schultze's method of inflation. The fœtus is grasped by both hands, the palmar surfaces on the scapulæ, the thumbs on the sternum, the head between the hands. The body is then raised until the legs drop over the physician's head; it is swung gently outwards and forward, in the arc of a

FIG. 68.

THE ARMS BESIDE THE HEAD.

circle, until it almost touches the floor. Expiration occurs during ascent; inspiration during descent. Should the heart's action fail, digitalis or strophanthus given by hypodermic injections, and the application of heat are often useful. The precaution should always be taken to remove mucus from the child's mouth and fauces with a bit of soft, old linen dipped in a solution of boracic acid.

When the arms of the fœtus have become extended beside the head, the physician must liberate them and bring them down. To accomplish this, the thighs of the child are grasped, we will

say, by the left hand; downward traction is first made upon the body, and then the trunk is bent strongly toward the mother's right side and obliquely upward and outward. The index and middle finger of the right hand are then passed over the child's right scapula, and along the upper surface of the humerus, until the bend of the elbow is reached. The fœtal arm is then flexed at the elbow and carried downward and across the child's chest, when

FIG. 69.

THE ARMS BESIDE THE HEAD.

it easily drops into the vagina. Grasping the thighs with the right hand, the body is then carried obliquely upward toward the mother's left side, and the left arm of the fœtus is liberated by the left hand of the physician.

The arms having been delivered, an effort should be made to deliver the head by the simple procedure already described. Should flexion not be well marked, the head may delay and the

life of the child be lost through the pressure of the pelvic floor upon the blood-vessels and nerves of the fœtal neck. It is necessary then to act with promptness. The physician should

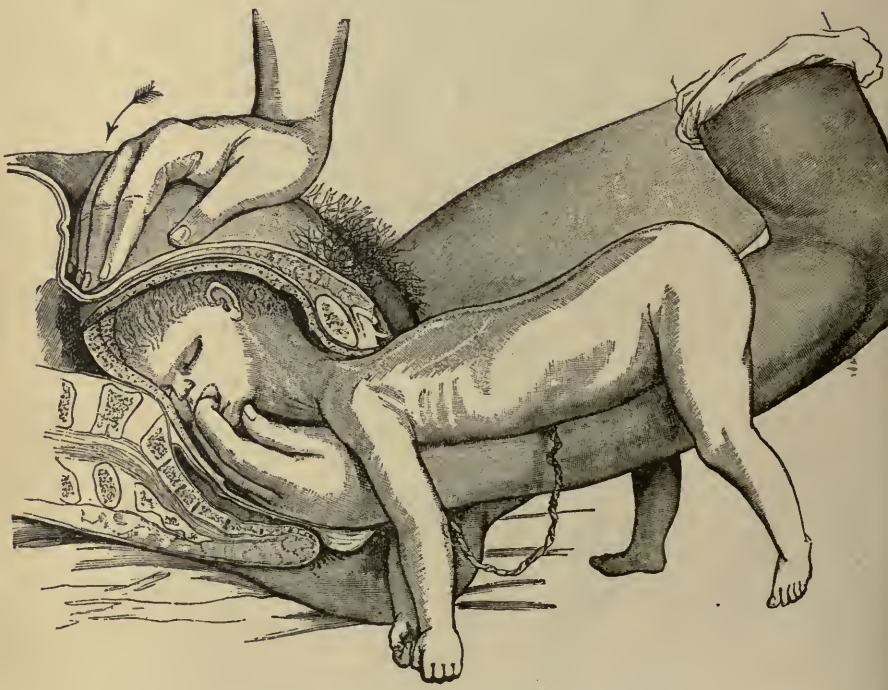
FIG. 70.

DELIVERING THE ARMS.

stand squarely in front of the patient, who has been brought to the edge of the bed and placed across it, her hips projecting over the edge. The left arm should be uncovered to the elbow, thoroughly cleansed, and should be turned with the palmar surface of

the hand upward. The body of the fœtus should then be placed astride the fore-arm of the physician, and the index and middle finger of the left hand should be passed upon the face of the child, making strong pressure upward and forward upon the malar prominences. Raising the body of the child upon his left arm, the physician should press strongly downward with his right hand

FIG. 71.



THE DELIVERY OF THE AFTER-COMING HEAD.

placed behind the pubic joint. Should he not succeed in promptly effecting delivery, he may place the middle finger of the left hand in the child's mouth, the index and other fingers resting upon the child's shoulders. He may thus make strong flexion, com-

bining it with external pressure, and urging the voluntary efforts of the mother.

If great resistance is to be overcome, the pressure behind the pubic joint may be made by an assistant, while the right hand of the physician is placed upon the child's back, the fingers of the hand grasping the shoulders to aid in traction. When the back of the child is directed posteriorly toward the mother's back, the same method of manual extraction is indicated, delivery occurring with the occiput behind; the forceps can often be used successfully to better advantage than when the back is anterior (Figs. 68, 69, 70 and 71).

The morbidity and mortality of breech presentations is not increased especially with the mother, but is considerably greater than usual with the child. Asphyxia and exhaustion through pressure upon the after coming head, the inspiration of matter from the birth-canal, and injury done to the mouth by efforts at delivery, are the principal dangers. It is not uncommon, after the delivery of the child in breech presentation, to have the development of broncho-pneumonia caused by inspiration. The use of antiseptic douches during the early stages of labor diminishes the risk of such pneumonia, and the delivery of the head without the introduction of the finger into the mouth also lessens risk. The causes of breech presentation are sometimes found in a relaxed condition of the uterus, which allows the fœtus to assume various positions during pregnancy. In twin pregnancy, it is common to find one of the children presenting by the breech. Labor is longer in breech than in head presentations as a rule, and the case demands patience and careful attention.

CHAPTER XVII.

LABOR IN TRANSVERSE POSITIONS.

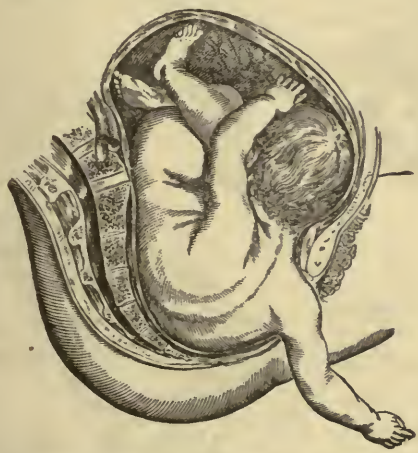
In contracted pelves and in large pelves where the membranes rupture suddenly and the amniotic liquid escapes rapidly, the fœtus may become turned transversely across the birth-canal, giving rise to a transverse position. The part which usually presents in these positions is the shoulder. This may best be understood if we suppose a case in which, during the latter months of pregnancy, the fœtus occupied the usual position in the uterus, that is, the back towards the mother's left side, the head at the brim of the pelvis, the occiput slightly in front. If now, for any reason, as contraction at the brim of the pelvis, the fœtus cannot descend through the brim, or if, by the sudden rush outward of the amniotic liquid the fœtus be suddenly moved downward, it may happen that the head will delay in the left iliac fossa, the breech will be near the right iliac fossa, the back of the child toward the abdomen of the mother, the feet in the upper portion of the right side of the mother, while opposite the left ilio-pectineal eminence will be found the posterior surface of the right scapula. As a rule, should labor pains continue, the right arm of the fœtus will descend and may even protrude.

When the child is of average size, its descent and expulsion spontaneously may be said to be impossible. It is true that a small fœtus or a fœtus in an abnormally large pelvis may be so folded upon itself by forcible uterine contractions that expulsion may take place. This occurrence, however, is so rare that the practitioner should never count upon its occurrence, but when the transverse position is detected he should at once rectify it and terminate the labor (Fig. 71).

The nomenclature of transverse presentations commonly ac-

cepted designates the posterior surface of the scapula as the cardinal point upon the fœtus. The word *dorso* is used to express the fact that the back of the child presents in these cases. The word *right* or *left* is added to the word *dorso* to designate the shoulder which is presenting. Thus the most frequent transverse position is that in which the right shoulder is at the brim of the pelvis, the back of the child directed in front as has been already explained. It rarely happens that the back of the child is turned posteriorly (Fig. 72).

FIG. 71.



ATTEMPTED SPONTANEOUS EVOLUTION IN TRANSVERSE POSITION.

The diagnosis of such positions and presentations may be made, first, by palpation, and then by internal examination. On palpating the abdomen, the head can usually be distinguished upon one side above the brim of the pelvis. The breech can generally be recognized upon the opposite side, and if the transverse position has existed for some time, a hand and arm will have prolapsed, and can readily be found upon examination. It is of practical importance to recognize promptly which shoulder is presenting, and this can be done by determining which hand is prolapsed. If the hand and fore-arm of the fœtus is turned with

the radial side or thumb uppermost, and the practitioner grasps the hand as if to shake hands with it, if the fœtal hand fits into his right hand, palm to palm, the fœtal arm is the right, and the right shoulder is presenting. If, however, the prolapsed hand fits the left hand of the practitioner, it is then the left shoulder which is presenting (Fig. 73).

Fig. 72.

Right Dorso-anterior.

A further diagnosis may be made by reaching the axilla with the finger, when the ribs of the child are easily distinguished. Passing the finger over the shoulder, the clavicle and the child's neck can sometimes be felt lying in a direction opposite to that in which the ribs were felt.

Fig. 73.

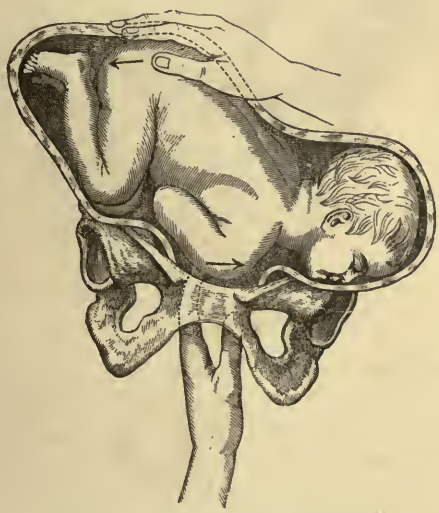
Right Dorso-posterior.

CHAPTER XVIII.

THE TREATMENT OF TRANSVERSE POSITIONS; VERSION.

In transverse positions, the treatment of such conditions consists in turning the child about so that its long axis shall coincide with the axis of the birth-canal. This may be accom-

Fig. 74.



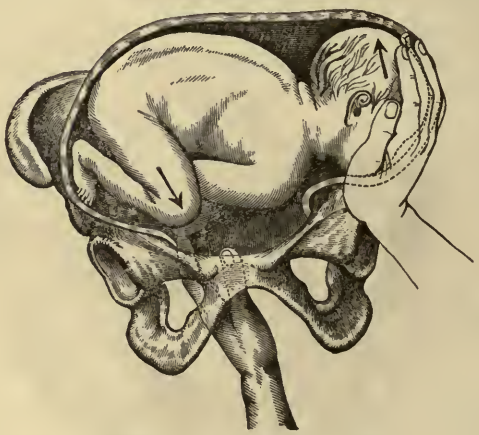
Combined Version (First Stage).

plished, first, by external manipulation only; second, by external and internal manipulation combined; and third, by turning the child within the womb.

To accomplish the first of these procedures, the membranes should not have ruptured, and the patient should not be in active labor. If she is sensitive and the abdominal muscles irritable,

she may be partially anæsthetized with ether or chloroform. The practitioner can usually outline the two extremities of the fœtus, and by pressing upward upon one of them and downward upon the other by a series of gentle sliding movements, either the head or the breech can usually be brought to the brim of the pelvis. This procedure is known as "External Version."

Fig. 75.



Combined Version (Second Stage).

By "Combined Version," we understand a method by which one hand of the physician is placed upon the abdomen, while two fingers of the other inserted within the vagina and cervix endeavor to lift up the presenting shoulder, thus dislodging it and favoring the turning. The external hand, by pressing upward upon the breech, favors the descent of the head. This method is often known as that of Braxton-Hicks. It is appropriate for cases in which the membranes have not ruptured; when the os and cervix are partly dilated, and uterine contractions are not strong. To perform this successfully, anæsthesia may be, but often-times is not, required (Figs. 74, 75 and 76).

"Internal Version," or turning the child within the womb, is the procedure necessary in cases in which the membranes have

ruptured, or are ruptured by the operator, and in which there is not sufficient time to perform either of the other manipulations. Internal Version consists in introducing a hand within the uterus, grasping the feet of the child and bringing them down, thus converting a transverse into a breech presentation. Although a serious procedure, it is one of the most valuable expedients in the

FIG. 76.

COMBINED VERSION (Third Stage).

obstetric art, and when skillfully performed, is very safe for mother and child. The patient should always be anæsthetized and placed across a bed, with her hips projecting over the edge. A preliminary antiseptic douche should be given, and, as in all obstetric operations, the bladder and rectum should be empty. Before proceeding to turn, the operator should carefully palpate the abdomen to determine the presence or absence of excessive

distension of the lower uterine segment. A clear diagnosis of the position and presentation should be made, and from such diagnosis the situation of the feet of the fœtus can be readily determined. The operator will then select for introduction the hand which will pass most readily to grasp the feet (Figs. 77 and 78).

FIG. 77.

INTERNAL VERSION (Grasping the Lower Foot).

Referring to our original example, in a right-dorso anterior position and presentation, the head of the child is in the left iliac-fossa of the mother, the feet and legs of the fœtus lying at the brim of the pelvis and posteriorly upon her right side. As the obstetrician sits before her, his left hand can be introduced most readily to grasp

the feet. His arm should be uncovered to the elbow, rings upon the fingers should be removed, and the nails cut short and carefully cleaned. The hand and arm should then be thoroughly antisepticized; the back of the hand may be slightly smeared with some antiseptic ointment. To introduce the hand, the patient being anæsthetized, the thumb and little finger may be folded toward

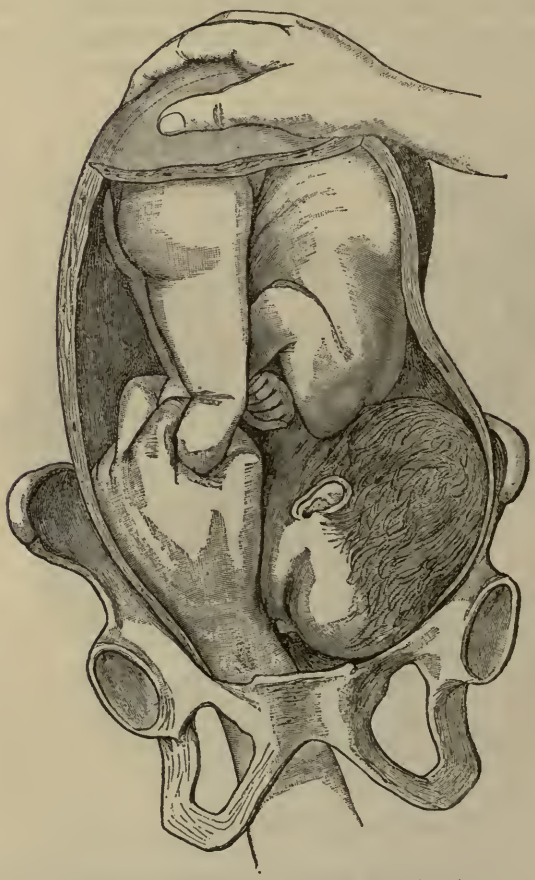
FIG. 78.

INTERNAL VERSION (Grasping the Upper Foot).

each other, thus reducing the width of the hand very considerably. The hand should be brought in such relation with the vulva that its greatest diameter of width will be parallel to the greatest diameter of the vulva. The right hand should palpate the abdomen externally, endeavoring to push up the fœtal head while the

other hand brings down the breech. The internal hand—the left, in the case which we are considering—should be gently

Fig. 79.

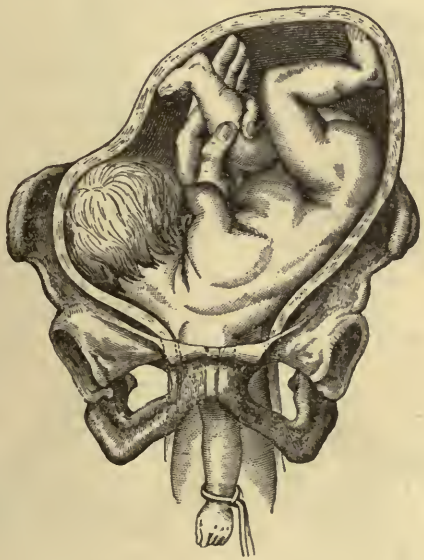


Internal Version (Grasping both Feet).

pushed on until the feet of the fœtus can be grasped. This simple manœuvre of grasping the child's feet should be so done that the finger nails of the operator are turned away from the

uterine wall and toward the centre of the uterine cavity. To accomplish this, the feet should be seized between the index and middle finger, and the thumb folded over upon them grasping them firmly in the palm of the folded hand, as shown in the accompanying illustration (Fig. 79). Traction by the internal hand should be slow, gentle, but strong. When the limbs of the fœtus

FIG. 80.



THE NOOSE IN VERSION.

have fully descended, the external hand should endeavor to push up the head, thus favoring version.

When the feet have been brought down, if haste is not necessary, it is well to delay the extraction of the child, allowing time for the mother's uterine contractions to expel it. If there be a fear lest the fœtal limbs should recede within the uterus, a loop of gauze or bandage should be slipped around a foot or hand. When version is accomplished, the subsequent course of the labor will be simply that of an ordinary breech presentation (Fig. 80).

It will be observed that version by external manipulation can be performed only before the membranes have ruptured, and no considerable degree of dilatation of the os and cervix exists.

Fig. 81.

The Obstetrician Anæsthetizing the Patient and Performing Version without Assistance.

Version by combined manipulation requires sufficient dilatation to permit at least the introduction of one or two fingers. The membranes may or may not have ruptured. In combined version it is often advantageous to introduce the four fingers through the

os, thus grasping the head or breech, and bringing it at once to the desired position. To perform internal version, the membranes must have ruptured, or must be ruptured, and dilatation should be at least almost complete (Fig. 81).

Version is further divided into Cephalic and Podalic, according as the head is brought to the brim of the pelvis, or the feet are brought down, as in internal version. Version as an operation will be further considered in treating of labor in contracted pelves, when we shall find that in transvere presentations in highly contracted pelves it may be necessary to lessen the size of the fœtal body by emptying the trunk of a portion of its contents or, in rare cases, by cutting through or dividing the trunk. So far as nomenclature of these presentations goes, we have, first, and far most common, right-dorso-anterior; second, and next in frequency, left-dorso-anterior, the dorso posterior positions being rare.

CHAPTER XIX.

LABOR WHEN THE CHILD AND THE BIRTH-CANAL OF THE MOTHER ARE DISPROPORTIONATE IN SIZE.

A CONSIDERABLE number of cases of difficult labor arise from the fact that the child and the birth-canal of the mother are not of proportionate size. In successive pregnancies, it is common to find a slight increase in the size of children born after the first. Again, conditions affecting the mother's nutrition may also influence the growth and size of her child. Thus, children born during a period of famine are naturally smaller than children born amid plenty. The most potent influence in determining the size and type of the fœtus is found in the size and type of the father. For example, marriage between a large and finely proportioned man and a small and ill-developed woman may result in children larger proportionately and better developed than the mother, although rarely attaining the stature and perfection of the father's form. On the other hand, a large and finely shaped woman, if married to a man inferior in size and development to herself, may give birth to children far inferior to her own excellences of form and feature. The influence of this law may be illustrated by reference to an actual case: an ill-developed, badly-nourished woman, married to a man as weak and poorly developed as she, gave birth to a small, ill-nourished child after a short and easy labor. The first husband dying, the mother married a large and well developed man, and became the second time pregnant. The size and proportions of the child were such that labor was so prolonged and difficult that the Cæsarean Section was seriously contemplated by the obstetrician in attendance.

Cases of disproportion between the size of the fœtus and the

birth canal may be conveniently divided into those in which the size and development of the child exceed comparatively those of the mother, and, second, those cases in which the birth-canal of the mother is contracted either by a deformity in the bony pelvis, or by a foreign growth, or previous pathological process in the mother's soft tissues. In cases where the disparity is that of size and development, pelvic measurements will reveal the fact that the pelvis is symmetrical in form, although often below the average in its diameters. Pelvimetry then gives us no information regarding the amount of disproportion in the size of the mother and child, but simply indicates that the mother is either of average size, or slightly below. There is no practical method available for measuring the child in the uterus, and any estimate as to the relation between its size and that of the mother's birth-canal must be reached by some method of practical comparison.

In cases in which the head is presenting, an effort should be made to fit the head into the bony pelvis as a head is fitted into a hat. To accomplish this, the patient should lie upon her back, the thighs flexed, and should there be such sensitiveness or irritability of the abdominal muscles as to cause spasmodic contraction upon pressure, an anæsthetic should be administered. The obstetrician then endeavors to press the head of the child gently into the pelvis of the mother. For this purpose, a hand should be placed transversely behind the pubes, while with the other, an internal examination is made, and the descent of the head is appreciated. If an assistant is available, he should place one hand upon the fundus of the uterus, the other above the pubes, and make pressure gently as already described.

By engagement is understood the fitting of the head into the brim of the pelvis; if it is found that the head enters the pelvis, or engages, its size is such that a favorable termination of labor may be expected in the usual way. If, however, the head fails to engage, but remains above the entrance to the pelvis, some abnormality exists which should be investigated.

In presentations other than those of the head, we have no practical method of estimating the relative size of the child and

the birth-canal. Thus, if the breech presents, a head too large to pass easily through the pelvis may be found at the fundus of the uterus, and yet no accurate idea of its comparative size can be obtained by palpation. Excessive distension of the abdomen, the complaint of the mother of excessive weight, and projection of the fundus of the uterus anteriorly, may point to the presence of one very large child, or of twins. Auscultation may determine that but one fœtal heart is beating in the uterus, when a rational inference would be that one child of excessive size was present.

Practical deductions from the effort to estimate the proportionate size of mother and child in symmetrical pelves bear directly upon the question of treatment. If the head can be brought to engage at the brim of the pelvis, and if the mother's muscular tissues, both of the uterus and of the abdominal walls, are sufficiently strong and firm to promise good expulsive efforts, the case should be left to proceed spontaneously, with the expectation that the patient will be able to bring the child through the brim of the pelvis and down upon the pelvic floor, where its delivery can usually be accomplished by the use of forceps, if necessary. When, however, the mother's uterus and abdominal muscles have been distended by previous labors, and their efficiency in contracting thus lessened, the obstetrician will not expect so much to be accomplished in delivery by the patient herself. When dilatation is well advanced, he must be ready, if the head engages but slightly, either to apply the forceps high up at the brim of the pelvis, or to perform version. In cases where the head is so large that it will not enter the brim of the pelvis at all under pressure from above, no attempt whatever should be made to induce it to enter by the forceps; but a consultation should be held with a view of delivering the patient by version, craniotomy or a Cæsarean section. The dangerous folly of attempting to drag a large head through a small pelvis is too painfully illustrated by actual occurrence in practice to need further demonstration.

CHAPTER XX.

LABOR COMPLICATED BY OBSTRUCTION IN THE BIRTH-CANAL.

LABOR WHEN THE SOFT PARTS OF THE MOTHER PRESENT OBSTACLES TO DELIVERY.—The birth-canal of the mother may be encroached upon by lesions of the soft tissues. The most frequent of these are fibroid tumors, cancer, ovarian tumors and contraction from stenosis resulting either from congenital malformation or from the presence of connective tissue produced by previous inflammation and ulceration. In regard to the presence of fibroid tumors and their influence upon labor, it may be said that labor is not often impossible by reason of this complication. A sub-peritoneal fibroid may become pedunculated by the uterine contractions at labor, and such tumors are sometimes discovered after the patient's recovery when previously their existence had remained unsuspected. Such a tumor may be demonstrated to be freely movable and connected with the uterus by a pedicle. Interstitial fibroids may delay labor by their presence amid the muscular tissues of the uterine wall, and the child may suffer the effects of pressure from such a tumor at its birth. After labor an interstitial fibroid often undergoes partial involution with the uterus. Should septic infection occur, such a tumor will become gangrenous, occasioning a serious complication.

Interstitial fibroids are of great importance in cases where Cæsarean section is performed. When the incision passes through such a tumor, it will not subsequently unite. Necrosis of the fibroid with septic absorption has been the result in cases of Cæsarean section where these growths have been incised. This furnishes a cogent reason for performing amputation of the uterus in such a case, instead of the usual Cæsarean section. Submucous fibroids of the uterus frequently occasion delay in

labor, but rarely preclude the possibility of its termination. There generally occurs a movement of accommodation on the part of the presenting portion of the fœtus and the tumor, which results in slipping the tumor upward and pressing the fœtus downward, so that birth is often possible where at first the outlook seemed most doubtful. The practitioner will do well not to have recourse to a dangerous obstetric operation upon the mother when he first discovers the existence of such a tumor during labor. Should, however, the fibroid become prolapsed, it is sometimes possible to sever its pedicle and deliver it before the birth of the child. Should such a tumor remain after the birth of the child, it is well, if possible, to remove it. Inversion of the uterus has sometimes resulted from traction made by the pedicle of a submucous fibroid during labor.

In cases of pregnancy complicated by cancer of the cervix, special precaution should be taken to keep the birth-canal, so far as possible, antisepticized. Douches of creolin or carbolic acid or permanganate of potassium, followed by the free use of iodoform in combination with bismuth or boric acid, may be employed to advantage for this end. If the cancer be discovered early when only the cervix uteri is involved, pregnancy is no contra-indication to the immediate removal of the growth. When, however, the cancer has penetrated above the cervix, the obstetrician should be prepared to further the continuance of the pregnancy, being ready to remove the child by Cæsarean section when viability is well assured. The outlook for the mother after such Cæsarean section is very grave from the danger of septic infection in the uterine incision from the cancer. By the free use of antiseptics and tamponing the vagina with iodoform gauze during the operation, it is possible to deliver a living child without materially shortening the life of the mother or increasing her suffering. When the cachexia caused by cancer is borne in mind, it will be seen that the free use of mercurial douches in these cases is unadvisable because of the added danger of mercurial intoxication. It is quite possible for labor to occur in a patient having cancer of the cervix and for the labor to termi-

nate spontaneously. If dilatation is delayed by the infiltration of the cervical tissues with the growth, it is admissible to incise the cervix to a moderate extent, thus facilitating delivery. By the strictest antiseptic precautions it is possible in these cases to preserve the life of the child.

Fibro-cystic tumor of the ovary or an ovarian cyst may complicate pregnancy and labor. It frequently happens that the pressure of the enlarged uterus upon such a tumor causes necrosis of its tissues, and may give rise to septicæmia. There can be no question of the duty of the obstetrician in such cases to at once remove the tumor. Pregnancy will generally go on to its normal limit, and should ovariotomy be necessary at the beginning of labor, it should not seriously endanger the mother's interests. Fibro-sarcomata of the pelvic tissues form a most serious complication of pregnancy and labor. If the patient is seen early in labor, amputation of the uterus is indicated. If the child is dead, however, embryotomy and its immediate removal are the duty of the obstetrician.

In cases of stenosis of the birth-canal arising from congenital malformation, careful examination of the patient should be made with a view to determine the possibility of incising and dilating. The possibilities of nature are so great that cases seemingly hopeless have been delivered through the natural channel. This is especially true in cases where the stenosis is the result of congenital malformation, and where the elasticity of the tissues has not been impaired by infiltration with pathological products. When it is decided, however, that birth cannot proceed normally, the Cæsarean section should be performed so soon as labor pains begin. It should be remembered that the obstetrician is not justified in amputating the uterus, thus destroying a patient's power of reproduction. There are on record a sufficient number of cases of repeated Cæsarean operation to justify simple uterine incision in these cases, and to discourage resort to amputation of the uterus. In cases where the tissues are infiltrated by pathological products, multiple incisions under antiseptic precautions have sometimes made it possible to deliver a viable child through

the natural passage. The most unfavorable of these cases are those of advanced syphilis, where the mother's danger of septic infection is very great. Here also the knowledge that the fœtus is probably infected, should lead the practitioner to regard the interests of the mother more, and those of the fœtus less, in deciding upon his treatment of the case.

CHAPTER XXI.

LABOR IN DEFORMED PELVES.

LABOR IN SYMMETRICALLY LARGE PELVES.—In women of large stature, and often without apparent cause in general development, the pelvis is found symmetrical, normally shaped, but larger than usually the case. These are called Symmetrically Enlarged (Justo-Major) Pelves. When the fœtus is of average size, labor in such pelves is rapid and easy. Occasionally the child turns across the pelvis, or the cord slips down and prolapses, when version is required.

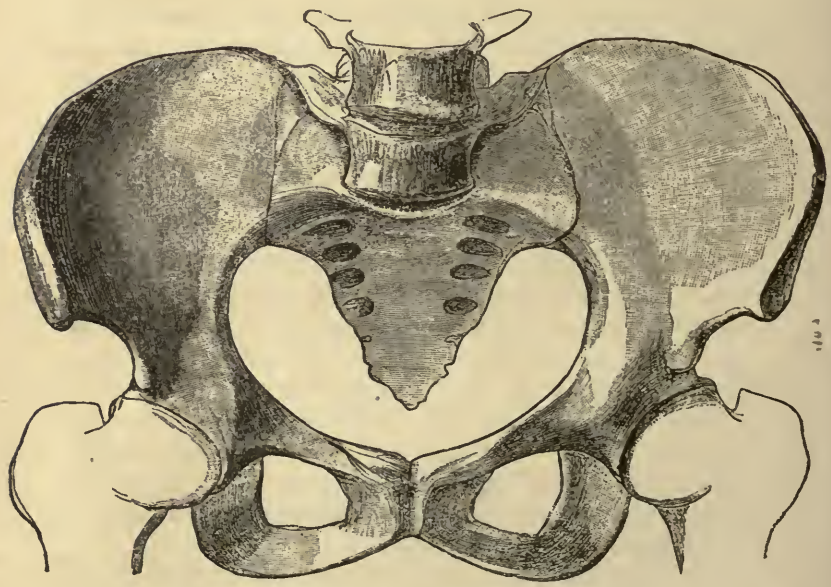
LABOR IN SYMMETRICALLY SMALL PELVES.—Such pelves are symmetrical, normally shaped, but below the average in dimensions. They are named Symmetrically Small (Justo-Minor) Pelves. Labor and its treatment in these pelves have been considered under the heading "Labor, when the Child and Birth-canal of the Mother are Disproportionate in Size." (Fig. 82).

The bony tissues of the mother's birth-canal may be deformed and contracted from several causes. Rhachitis, osteo-malacia, fractures and abnormalities caused by abnormal forces acting upon the skeleton during the period of development, are the most frequent causes of bony deformities.

It will be interesting to note some of the factors which give to the pelvis its usual contour and proportions. The most apparent force tending to push the sacrum downward and forward is the weight of the head and trunk transmitted through the spinal column. Acting at nearly right angles to these is the force exercised in walking and standing by pressure by the heads of the femora in the acetabular cavities. These two forces are modified by the elasticity of the pelvic bones, and by the strength of the ligaments at the pubic joint, the ischio-sacral

and coccygeal ligaments, and by the inherent tendency through long evolution possessed by the bony tissues of the female organism to develop after its type. The result of all these interacting forces is a pelvis of average proportions (Figs. 83 and 84). When, however, any one of these factors in development is deficient, there results a lack of symmetry or deformity in the pelvis. The most simple of these conditions is contraction in the antero-posterior di-

FIG. 82.



SYMMETRICALLY SMALL (JUSTO-MINOR) PELVIS.

ameter only, giving rise to the simple, flat pelvis. This occurs in women who have been prevented by any reason from exercising the lower limbs during childhood, as in cases of infantile paralysis, where the lower extremities have been partially or wholly paralyzed, and life is still persistent. Such children remain principally in the sitting posture, thus transmitting weight downward upon the

sacrum, while the counteracting forces of pressure by the femora are lacking. In many cases, no cause whatever can be ascertained for the occurrence of this deformity. There is usually no sign of

FIG. 83.

THE POSTURE AND ABDOMINAL PROTRUSION IN A WELL-FORMED PREGNANT WOMAN.

FIG. 84.

POSTERIOR SURFACE OF A WELL-FORMED FEMALE BODY.

its presence in the stature or development of the patient, and hence the great liability of the obstetrician to overlook such a

deformity unless it is his custom to universally measure the pelvis of his patient. When labor occurs in a simple, flat pelvis, the head will naturally turn in such a position as to bring one of its lesser diameters in relation with the smallest diameter of the pelvis. This results in a transverse position of the head at the brim, the bi-temporal or bi-parietal diameter being brought in relation with the antero-posterior diameter of the pelvic brim (Fig. 85). If the contraction be not excessive, and the patient's expulsive forces be good, the head will descend transversely through the brim of the pelvis. The centre of the pelvic cavity and the pelvic floor being reached, there will be found no obstacle to rotation, and labor may proceed normally. When, however, the narrowing at the brim of the pelvis is considerable, the head will not descend, but will remain transversely at the brim. The pressure of the uterus continuing, one of the parietal bones will gradually descend lower than the other, and thus what is known as a parietal presentation will result.

Fig. 85.

Head entering a Flat Pelvis.

So far as the question of detection is concerned in such pelves, a diagnosis will be readily made by any one who practices pelvimetry as a rule. The narrowing of the antero-posterior diameter, while the other diameters of the pelvis remain unaltered, renders the diagnosis comparatively simple. If the obstetrician has the patient under his charge during the second half of her pregnancy, he may select a favorable opportunity for the induction of labor. It has been found that the greatest transverse diameter of the fœtal head increases most from the thirtieth to the thirty-sixth week. Accordingly, when the antero-posterior diameter measures eight centimetres, or three and one-eighth inches and over, we may delay until the thirty-fifth week for the induction of labor. When it measures seven and a half to eight

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1.—Inlet of normal pelvis.

Fig. 2.—Inlet of symmetrically contracted pelvis.

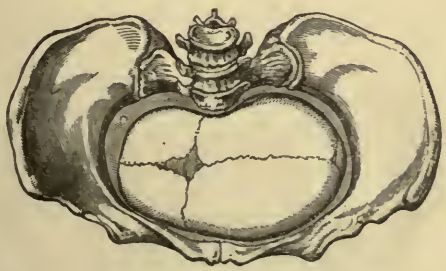
Fig. 3.—Inlet of obliquely contracted pelvis. (Lumbo-sacral kypho-scoliosis.)

Deformed Pelves. (Martin.)

centimetres, or two and nine-tenths to three and one-eighth inches, the thirty-first to the thirty-fourth week may be chosen, and when this diameter is smaller than two and nine-tenths inches, it is not well to delay beyond the thirtieth week. The obstetrician will hope that by the induction of labor the head may be enabled to descend through the brim of the pelvis, and the labor terminate spontaneously. When, however, he is called to a case at the end of gestation, in which he finds a simple, flat pelvis, he will do well to delay only until dilatation is complete, and opportunity has been afforded the head to descend by the natural forces of expulsion through the brim of the pelvis. Should such descent not occur promptly, podalic version should be performed, and the child delivered in that manner. The use of the forceps in simple, flat pelves is rarely to be chosen, as the instrument grasps the head at a disadvantage, and injury to the mother and child is likely to result (Fig. 86).

A rhachitic pelvis presents not only contraction in the antero-posterior diameter of the brim, but also a diminution in the

FIG. 86.

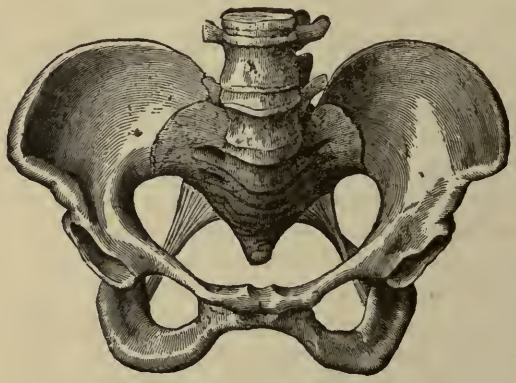


FLAT PELVIS, THE HEAD PASSING THROUGH AFTER VERSION.

transverse diameters of the pelvis. It will be remembered that in the normal pelvis the distance between the anterior-superior spines is always less than the distance between the outermost points of the crests. In the rhachitic pelvis this relation is either lost or reversed. The upper edges of the ilia, instead of curving downward from the anterior-superior spine, extend di-

rectly backward, or even curve slightly inward. Upon pelvimetry, the obstetrician will find the antero-posterior diameter of the pelvis

Fig. 87.



Flat Rhachitic Pelvis.

shortened, the transverse diameters contracted as indicated, and not infrequently some variation on closer examination in the ob-

Fig. 88.

Flat Rhachitic Pelvis.

lique measurements of the pelvis (Figs. 87 and 88). In addition to these diagnostic points, close inspection of the patient's skeleton

Fig. 1.

Fig. 3.

Fig. 2.

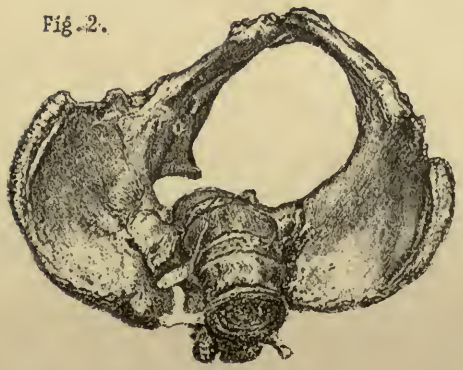


Fig. 4

FIG. 1.—Inlet of flat, rhachitic pelvis.
FIG. 2 —Inlet of obliquely contracted, anchylosed pelvis.

FIG. 3.—Inlet of osteomalacic pelvis.
FIG. 4.—Inlet of pelvis contracted by exostoses.

Deformed Pelves. (Martin.)

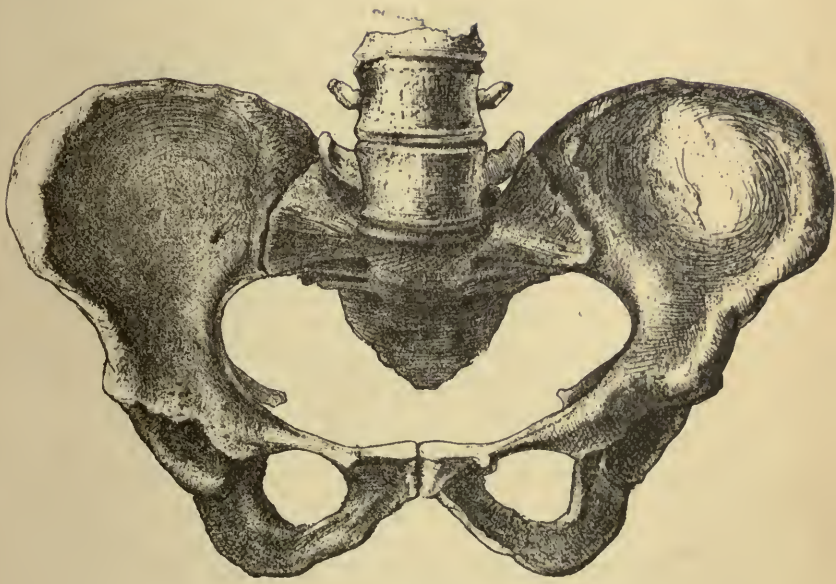
will reveal crooked limbs, enlargement of the epiphyses at the extremities of the long bones, enlargement of the costal cartilages, producing the beaded appearance of the ribs and sternum, with the characteristic deformity of the cranium and face. Labor in such pelves will be difficult in proportion as the child is large, and the pelvis greatly deformed. Here again the same indications for the induction of labor obtain which have just been stated in the simple, flat pelvis. As a rule, the head will enter in strong flexion, and should the child be small and the mother strong, the head may be forced down through the brim of the pelvis upon the pelvic floor. Labor may then be terminated by the careful use of the forceps. Should the head engage, the forceps may be applied at the brim of the pelvis, and axis-traction performed to deliver the child. If the head does not engage, but after labor-pains have become well established it continues to remain at the brim of the pelvis, or passes to one side into one of the iliac fossæ, the question of craniotomy or the Cæsarean operation must be raised (Fig. 89). In flat, rhachitic pelves, no advantage will be obtained by performing podalic version, as extension of the head would probably result in impaction and subsequent death of the fœtus.

Fig. 89.

Attitude and Abdominal Protrusion (Pendulous Abdomen) of Woman with Rhachitic Pelvis.

Rhachitis may be found in combination with other deformities of the pelvis, resulting in irregularly shaped pelves, giving rise to various abnormalities in the course of labor. Thus, projection backward of the spinal column called kyphosis may be present, causing an enlargement of some diameters of the pelvis, with a contraction of others. Again, hip-joint disease in a rhachitic person would result in an oblique deformity of the pelvis, and hence a diminution in the oblique diameters. These mixed deformities of the pelvis can best be appreciated by internal palpation. The obstetrician, finding that the measurements obtained by external pelvimetry are abnormal, will then have recourse to an internal examination of the pelvis. Two or three fingers should be introduced, and the sides of the pelvis thoroughly examined. Thus a contraction at the brim can be estimated, and projection inward at the side of the pelvis will be detected, and by placing a finger upon each tuberosity of the ischium some idea may be gained as to the dimensions of the pelvic outlet. While elaborate instruments have been devised for such examination, none has been found so efficient as the hand of an intelligent observer. In estimating the existence of a deformity at the pelvic outlet during labor, the practitioner will find it of value to examine the lateral diameter of the pelvis at a line drawn from one spine of the ischia to the other. Should he find that the head with its greatest circumference has passed a line drawn between the spines of the ischia, he may conclude that no contraction sufficient to prevent the spontaneous termination of labor exists at the pelvic outlet.

Spinal deformities are not infrequently associated with rhachitis, and may delay the descent of the fœtus into the pelvic cavity. A projection forward of the spinal column known as lordosis; lateral curvature of the spine known as scoliosis, kyphosis already mentioned, and a peculiar deformity caused by a partial dislocation of the body of one vertebra upon that below, with a lateral twist of the vertebræ called spondylolisthesis, may prevent descent of the body of the fœtus or cause an abnormality in its presentation or in the mechanism of labor (Fig. 90). Such spinal deformities, when detected during pregnancy, are additional indications of the

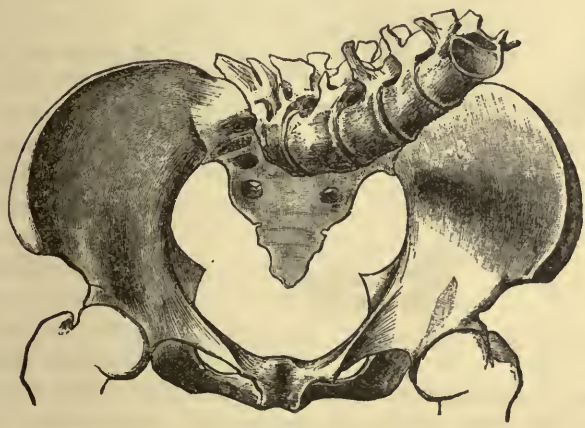


Flat Rhachitic Pelvis. (Martin.)

probable existence of pelvic deformity, and should not escape the attention of the obstetrician.

While the simple, flat pelvis and the rhachitis pelvis are most common, there exist comparatively rare forms of pelvic deformity known as the obliquely contracted pelvis of Naegele, the funnel-shaped pelvis, the infantile pelvis, and the osteo-malacic pelvis.

FIG. 90.



SPONDYLOLISTHETIC PELVIS.

The obliquely contracted pelvis can be examined by measuring between the posterior superior spines and the anterior superior of opposite sides (Fig. 91).

The funnel-shaped pelvis retains somewhat the type of the male pelvis and, as its name implies, is longer and narrower than the normal.

In the infantile pelvis, the widening and expansion characteristic of the normal female pelvis have not occurred, and the pelvis remains practically that of a young child.

In the osteo-malacic pelvis, softening of the bones has resulted in the bending inward of the anterior half of the pelvis, bringing the two rami of the pubes almost in apposition in the form of an irregular beak or projection. Other indentations of the pelvis may

result from osteo-malacia, giving rise to various deformities. It may be noted that the disease may occur during pregnancy. It is characterized by severe rheumatic-like pains in the pelvic bones, by great prostration, and by softening which becomes evident upon careful examination. So severe may be these symptoms that the interruption of pregnancy may be necessary to preserve the life of the mother. When recovery takes place from osteo-malacia, a process of thinning of the bones occurs known as osteo-porosis. The pelvis becomes thinner, lighter in weight, more fragile in consistence. On the other hand, when rhachitis advances but slightly, and recovery occurs during early life, a process of hardening and deposition of bony material takes place which is styled osteo-sclerosis.

FIG. 91.

OBLIQUELY CONTRACTED PELVIS FOLLOWING FRACTURE.

In summarizing the indications for treatment in deformed pelves, it may be repeated that the induction of labor should be kept in mind in cases coming under the care of the obstetrician before term. As pregnancy progresses, the simple manœuvre already described of pressing the head into the pelvis may be employed at intervals of ten days or two weeks to give some idea as to the time when the induction of labor is necessary. When the head will not engage under gentle pressure, pregnancy should be interrupted. In simple, flat pelves, the obstetrician must be prepared to terminate labor by version. In flat, rhachitic pelves, a cautious use of the forceps, with craniotomy and Cæsarean section to be kept in reserve, is indicated.

CHAPTER XXII.

PREMATURE LABOR.

ABORTION: MISCARRIAGE.—In a considerable proportion of cases pregnancy is terminated before its usual duration has expired through some disease or accident. It has been customary to designate the termination of pregnancy before the formation of the placenta at the fourth month as abortion; between the fourth month and the period of viability at the seventh month as miscarriage; and between the seventh month and ninth month as premature labor; these distinctions, however, are without practical differences, and the simpler way is to consider the interruption of pregnancy before the period of viability as abortion, and between the period of viability and the usual termination of pregnancy as premature labor. The word miscarriage is less objectionable to the minds of patients who commonly associate with the term abortion a possible criminal element.

The causes of the premature termination of pregnancy are those which affect the mother or the ovum or both; most common of all is syphilis. In regard to the conveyance of the syphilitic poison, it is possible for a syphilitic father to beget syphilitic children without infecting necessarily the mother; it is probably impossible for a syphilitic woman to bear a child not tainted by syphilis; when father and mother are both syphilitic the offspring present unmistakable evidences of syphilis. Diseases which affect the general health of the mother also interrupt pregnancy; acute infections causing high temperature commonly interrupt pregnancy when the temperature remains above 104° F. for a considerable time. Chronic infections, such as, in addition to syphilis, malaria, lead poisoning, and alcoholism cause abortion.

Diseases affecting the fœtus and its envelopes also terminate its

existence; such are dropsy of the chorion, adhesion between the layers of the amnion and the abnormal secretion of amnial liquid. Violence may affect the mother and ovum by separating the latter from the wall of the uterus by rupturing the membranes, or by its influence upon the nervous system producing uterine contractions; the effect of mechanical violence depends, however, largely upon the condition of the mother's tissues; where the woman has never had endometritis and her tissues are in a healthy condition, she may sustain a very considerable degree of direct mechanical violence without the occurrence of abortion; persistent disturbance is often more dangerous than a considerable shock; thus the jar of a railway train will sometimes produce disaster, when a fall of several feet will not. That which tends to increase irritability of the nervous system also results in the interruption of pregnancy, and when once this condition of exaggerated reflexes exists the slightest cause may produce an interruption of pregnancy.

The symptoms of a threatened termination of pregnancy are abdominal pain and hemorrhage; the pain is caused by the contraction of the uterus, and hence is to be distinguished from intestinal colic, neuralgia of the solar plexus, acute dyspepsia, or the suffering caused by a distended bladder; the hemorrhage is bright in color, and varying in quantity; should the process go on, further symptoms are an increase in the hemorrhage, with the discharge of portions of the ovum or the ovum entire. The interruption of pregnancy is most common between the third and fourth month, and at any period of pregnancy when menstruation should have occurred if conception had not taken place.

The treatment of abortion and premature labor consists, first, in prophylaxis; if syphilis exists, the patient should be treated by the administration of the bin-iodide or bi-chloride of mercury, together with cod-liver oil, hypophosphites, iron and arsenic; it is to be remembered that the treatment of syphilis demands not only the use of alteratives but also the employment of those agents which will most effectively favor the reproduction of the blood. During acute diseases but little can be done to prevent the interruption of pregnancy beyond that which is indicated in

the mother's interest only; it is well to control if possible the patient's fever and lessen the irritability of her nervous system; conditions of chronic infection are to be remedied by appropriate treatment which is most advantageously employed when the patient is not pregnant.

By the habit of abortion is understood the recurrence of this accident; when the cause is found and removed the habit is broken. In cases which present no easily found cause for abortion it is well first to see that the patient is not suffering from chronic endometritis; should such be the case, dilatation of the uterus followed by the application of antiseptic and alterative substances to the endometrium, and often the removal of the diseased tissue by the curette may be followed by conception. When no cause other than excessive irritability be found, it is sometimes necessary to place the patient entirely at rest until her pregnancy be several months advanced; actual confinement to her bed is the only successful treatment for such a condition: her health, in the meantime, should be maintained by massage and attention to her nutrition. When abortion has actually begun absolute rest is imperative; usually opium will be found the best drug to allay the activity of the nervous system; the patient should abstain from all kinds of stimulants, should remain lightly clad, and avoid heating and stimulating food (Fig. 92).

Should the physician fail in his efforts to check the premature expulsion of the ovum, his treatment should be addressed to securing its expulsion entire; in cases occurring prior to the fourth month this can best be done by controlling the hemorrhage with an antiseptic tampon and stimulating uterine contractions; as material for the tampon, iodoform gauze, bi-chloride of mercury gauze, or masses of cotton impregnated with an antiseptic may be employed. Where the odor of iodoform is not objectionable, iodoform gauze should be chosen; in the absence of gauze, cheese cloth soaked in a solution of bi-chloride of mercury, one to five thousand will answer; failing to obtain cheese cloth, an ordinary roller bandage or a strip of old sheeting will serve every purpose; if the assistance of a nurse is available it is well to

have the patient given a hot antiseptic vaginal douche; following this she is placed across a bed at the edge; introducing one or two fingers of one hand as a guide, the physician takes the end of the strip of tampon, and, with a pair of dressing forceps, passes it up, and with the finger packs it thoroughly into the os and cervix, and around these parts; the vagina may also be moderately distended with the same material; the administration of ergot in medium doses, fifteen to thirty drops of the fluid extract every two or three hours, combined with the administration of quinine in debilitated patients, is also indicated. Under such treatment it is usual, after from six to twelve hours, for the physician to find the ovum in the upper portion of the vagina upon removing the tampon; he may find it just within the os, whence he should remove it cautiously with the finger; after its expulsion a hot vaginal douche should be given, and if the fingers or any instrument have entered the uterus, an intra-uterine douche should be administered.

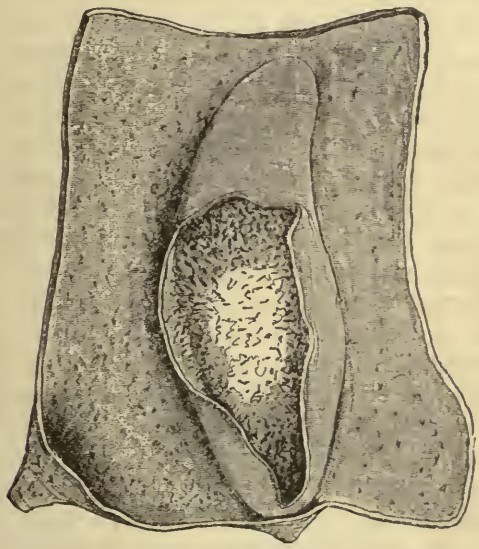
FIG. 92.

OVUM OF TWO MONTHS, INTACT.

Should the ovum rupture, and a portion be retained, the uterus should be explored as soon as possible by the antisepticized finger of the obstetrician and its contents removed; if sufficient dilatation is not present to permit of this manipulation, Barnes' dilators, or a solid uterine dilator, such as Simons', may be employed; and if the cervix is found resisting, a tupelo, or slippery-elm tent should be used (Fig. 93). Next to the finger as an instrument for emptying the uterus after abortion, stands the intra-uterine curette; of these our preference, from experience,

is for that of Carl Braun, which has a long, hollow handle terminating in a blade whose edge is as sharp as that of a paper-knife; this handle is connected with a fountain syringe, and thus a constant stream of antiseptic fluid irrigates the uterine wall while the curette removes retained material; after the uterus has been emptied and cleansed, it is well to leave within its cavity sixty

FIG. 93.



SAME OVUM, THE DECIDUOUS MEMBRANES OPENED, SHOWING VILLI OF CHORION.

grains of iodoform, aristol, or boracic acid in the form of a suppository. In view of the fact that portions of the ovum are often retained and spontaneously expelled without serious consequences to the patient, such thorough precautions may seem meddlesome and injudicious, but the number of cases of septicæmia which follow abortion is sufficiently great to warrant the obstetrician who desires to do his duty in not leaving his patient until he is satisfied that her genital tract has been thoroughly antisepticized.

The treatment of abortion after the fifth month resembles that of normal labor, except that delay may occur in the dilatation of the os and cervix, and difficulty may be experienced in aiding the expulsion of the fœtus; as the uterus is not fully prepared for labor, deficient expulsive pains are not uncommon. Although the fœtus may present by the head, it will be better in such cases to perform version and extraction by the feet, as the forceps is not always successful in grasping securely the head of a premature fœtus. It is in cases of this sort that adherent placenta is most often encountered, although in the minds of patients and their friends the placenta is thought to be adherent when it is not promptly expelled. The obstetrician will recall the fact that adherent placenta is not a frequent complication, while temporary retention of the placenta occurs quite frequently. In cases where the placenta is attached to the uterine wall so firmly that uterine contractions do not separate it, a cautious attempt should be made by the obstetrician to separate and remove it with his hand; the greatest care should be exercised not to wound the uterine tissue any more than can possibly be avoided, and, rather than do violence, it is better to allow the placenta to remain, after antisepticizing the uterus, and keep the patient under observation until the placenta shall have become loosened, when it can be safely extracted. During this time, until the placenta can be removed, four vaginal douches of bi-chloride of mercury, one to five thousand, should be given in twenty-four hours; the uterus should be irrigated twice in twenty-four hours with carbolic acid, creolin, thymol or boracic acid, as has been elsewhere described; the local disinfection of the uterus should be maintained by iodoform, aristol or boracic acid, by uterine suppositories, and an antiseptic tampon can often be kept within the uterus to advantage. Under such precautions it is safe to wait for the loosening and expulsion of the placenta without radical interference; but under less careful precautions it is hazardous to do so; the curette is of advantage in such cases after the placenta has become loosened and small fragments still remain which do not admit of easy removal by the finger.

Abortion is also divided into therapeutic and criminal; by therapeutic abortion is understood the intentional interruption of pregnancy by the obstetrician in the interests of the mother; pernicious vomiting, toxæmia, threatening eclampsia, and some obstruction in the mother's birth-canal are the most frequent indications; the method best chosen in these cases consists in the dilatation of the uterus by tents, by solid dilators, or the Barnes' bag, with the removal of the ovum, as has just been described. In cases where pregnancy is further advanced, a bougie may be introduced into the uterus between the membranes and the wall of the uterus, and allowed to remain until expelled by uterine contraction. In very early pregnancy the introduction of a sound into the uterus may rupture the ovum, when it may be absorbed without danger to the patient. Her safety, however, in all these procedures depends very largely upon the careful antisepsis practiced by the physician, and in general it may be stated that that method of producing abortion is best which is most sure to do little violence to the mother's uterus, and leave it entirely empty.

By criminal abortion is understood the interruption of pregnancy without justification; this is commonly practiced by the administration of drugs supposed to produce uterine contractions; such are tansy, nutmeg, ginger, cantharides, and a number of patent medicines whose active principle is usually ergot or quinine. It is extremely doubtful in healthy women whether any of these drugs are capable of producing the desired effect; they are certainly far from being reliable; failing to produce abortion with these means, the patient usually seeks the assistance of an accomplice; the injection of hot or cold water into the vagina, and the introduction into the uterus of a foreign body, are the most usual methods employed; splinters of wood, hair-pins, pieces of whalebone, pieces of wire, and various articles have been used for this purpose.

Those who practice abortion are usually ignorant of antiseptic precautions, and hence septic infection following criminal abortion, with death from septicæmia and peritonitis, are not uncommon;

electricity has been tried to produce abortion, occasionally with success, often with failure.

Diagnostic signs of criminal abortion, either attempted or successful, are signs of early pregnancy with some evidence that injury has been done to the genital tract; when such evidence is presented, the physician called to care for such a patient should remember the danger of septic infection and endeavor to counteract it, while co-operating with the authorities to bring the offender to justice.

CHAPTER XXIII.

INDUCED LABOR.

WHENEVER the interests of mother or child demand the termination of labor after the child is viable, but without waiting for the forces of Nature to produce spontaneous labor, the artificial ending of gestation is known as induced labor. The indications for this procedure are diseases seriously threatening the life of the mother, a contracted condition of the birth-canal, making it dangerous for delivery to take place when the child is at term, and any condition of the fœtus rendering its death probable if it be allowed to remain in the uterus.

Among the maternal indications for induced labor are such diseases of the mother as result in pathological changes in the endometrium and placenta, rendering the life of the child impossible after a certain period of pregnancy. This may be well illustrated by chronic nephritis occurring during pregnancy. Whenever the obstetrician detects habitually in the urine of the pregnant woman various forms of tube-casts, with or without albumin, and this condition persists, he will know that the existence of the fœtus is jeopardized, and that labor should be induced when viability is assured. A distinction should be made between acute and chronic disease processes in the mother as regards the interruption of pregnancy. In acute infectious diseases, the course of the disease is usually influenced unfavorably by any effort to terminate the pregnancy, while in many chronic conditions the induction of labor greatly relieves the patient. The death of the fœtus furnishes an indication for the induction of labor, and also any history of complications occurring during previous pregnancies, or at previous labors, threatening the lives of mother and child.

In so far as contraction of the birth-canal is an indication for the induction of labor, this will evidently depend upon a com-

parison instituted between the size of the child and that of the birth-canal, as has been already described. In the section upon labor in contracted pelves, this point has been discussed, and also the precise periods of pregnancy at which interruption was justified. In general, it may be stated that when upon examination of a pregnant woman the antero-posterior diameter at the brim of the pelvis is found to measure but eight centimetres, or three and one-eighth inches, the question of the induction of labor should be seriously considered.

The methods of inducing labor consist in efforts by various means to cause uterine contraction. These efforts have been made by directly irritating the uterus, as with an electric current, with dilators or a bougie; also by the giving of some drug acting upon the uterine muscle and causing contraction, or by disturbing the relations of the fœtus and the uterus by evacuating the amniotic liquid, thus allowing the child itself to make pressure against the wall of the uterus and excite contraction.

To specify more clearly, the induction of labor has been attempted by the use of a strong faradic current, one pole being placed above the pubes, the other upon the lumbar spine. Efforts have been made to secure uterine contractions by rubbing or kneading the uterus, and also by hot douches. Barnes' dilators and tents of various sorts have also been introduced to dilate the cervix and promote uterine contractions. Water has been injected into the uterus between the membranes and the wall of the womb, to cause uterine contractions. Drugs whose properties are to irritate and excite the uterine muscle have also been given, such as ergot, tansy, quinine, strychnine and some of the volatile oils. The membranes have also been ruptured, a portion of the amniotic liquid allowed to escape, and the head brought directly against the os and cervix, thus exciting uterine contractions; but the best and safest of all methods consists in introducing within the uterus, between the membranes and the wall of the womb, a flexible rod or bougie. This acts as a foreign body whose irritation rarely fails to bring on labor. Second in efficiency and value to this is the use of Barnes' dilators. In intro-

ducing a bougie, one should be selected which is solid, and which has never been used before. A medium size should be chosen, and care should be taken that the bougie has not been corroded or roughened in any manner. It should be immersed for some time in a solution of bichloride of mercury one to five hundred, after which it may be kept in a mercurial solution one to two thousand, or in a carbolic solution five per cent., until it is used. If convenient, a vaginal douche should be given before the introduction of the bougie. The greatest care should be exercised by the obstetrician in cleansing his hands and in avoiding contact between the bougie and the bedding of the patient while introducing it. Two fingers of one hand are then inserted to the cervix, and the bougie passed along these fingers as a guide through the os. No force should be used in introduction; but it should be allowed to go where it will pass most easily, care being taken to avoid rupturing the membranes. The bougie should be inserted until but an inch of its length remains outside the cervix. If it shows a tendency to slip out easily, a moderate tampon of iodoform gauze should be inserted to retain it in position.

A bougie may be conveniently inserted during the afternoon or evening. Intermittent uterine contractions causing dilatation will usually continue during the night. In the morning, it will be found upon examination that softening and dilatation of the os and cervix have resulted. The bougie should then be removed, an antiseptic douche be given, and the first bougie with a second in addition should be introduced. The number may be increased until several are employed at once. The length of time required to bring on active uterine contractions by this method varies greatly. Forty-eight hours will usually suffice to cause active labor, but in a case in the experience of the writer, bougies remained in the uterus between five and six days before labor came on. If antiseptic precautions be faithfully observed, and the membranes be not ruptured, no harm will come to the patient from a prolonged use of this method.

The employment of a Barnes' dilator to induce labor is indicated

in cases where the os and cervix are already sufficiently large to admit of its introduction, and where it is desired to dilate the uterus and terminate labor as speedily as possible. The obstetrician should provide himself with several sizes of dilators whose capacity he ascertains before using them. A dilator should be slightly oiled, and introduced well into the cervix. An antiseptic solution is then forced into the dilator until considerable distension and the firm application of the dilator to the sides of the cervix have been secured. If the capacity of each Barnes' bag is known by the obstetrician, little danger will exist of rupturing the dilator and forcing fluid into the uterine cavity. The use of an antiseptic fluid reduces the risk from this accident to a minimum. It will usually be found in between one and two hours that the dilator has accomplished its mission, and that a second and larger is required. In from four to eight hours the uterus may be so dilated by this method that the application of forceps, or performance of version, will be possible.

When induced labor has fairly begun, it should be remembered that the patient has greater difficulties than usual to overcome. The physiological softening and dilatation of the birth-canal which occur at normal labors are rarely present to the same degree. Induced labor may then be longer, more painful, and more exhausting. On the other hand, the fact that the child is smaller than in labor at term will prove an advantage at the time of delivery. Every precaution should be taken to maintain an aseptic condition of the patient because her liabilities to infection by reason of the interference practised are greater than in normal cases. When labor is induced by the use of the bougie or Barnes' dilators, morbidity and mortality rates of the mother should not be higher under antiseptic precautions than normal. The dangers to the child are greater than usual because of the possible failure in dilatation and also because of the necessity often arising of operative interference in the delivery. If induced labor be delayed, the child will frequently perish from pressure of the uterus upon it, or from inspiration pneumonia coming on shortly after delivery, and occasioned by the entrance of the secretions from the vagina into the respiratory passages as labor progresses.

CHAPTER XXIV.

MULTIPLE PREGNANCY.

When the genital tract of the woman contains more than one impregnated ovum the pregnancy is multiple or plural. Usually the ova find lodgement and develope in the uterus; occasionally one developes in the uterus and one in the Fallopian tube; rarely there is multiple ectopic pregnancy. When there are two ova the pregnancy is said to be with twins; when three, triplets; with four, quadruplets; with five, quintriplets; with six, sextuplets. One authentic case of miscarriage with six fœtuses is recorded as having occurred in Italian Switzerland, the greatest number on record. Twins occur on an average about once in 100 cases; triplets, once in 8,000; quadruplets, once in 400,000. These averages vary greatly in different races and countries.

Two terms are used to express the impregnation of more than one ovum, Superfecundation and Superfœtation. Superfecundation refers to the successive impregnation of several ova before an impregnated ovum has reached the uterus and before a second ovulation. This is observed in cases when twins are born of different parentage, one black, the other a light mulatto. It has also been seen in cases where two ova of the same parentage have been found at different stages of development, one in the uterus, the other in some other portion of the genital tract. These cases are explicable by successive coitions by the same or different fathers.

Superfœtation refers to the impregnation of a second ovum when the first has already advanced several weeks and has reached the uterine cavity. A second ovulation, after the first impregnation, would seem necessary to explain superfœtation.

Superfecundation occurs not infrequently; superfœtation cannot occur after the ovular and uterine decidua join, in the fourth month, and probably rarely takes place before.

Twins are most often of similar sex, and more frequently boys. When of the same sex they often resemble each other very closely in physical and mental characteristics. They are rarely of precisely the same weight, although their combined weight exceeds that of a single fœtus. The amnion and chorion of one ovum are not infrequently observed to take up considerable space on the fœtal surface of the placenta of the other ovum. Decreased nutrition in the second ovum results. Five-sevenths of all cases of twins have but one placenta, this fact furnishing an argument against superfœtation. When the sex is the same there is one placenta, with one chorion and two amnions. When the sex is unlike it is not infrequent to find two chorions and two amnions with one placenta, both ova having been derived from a single follicle. There is then no vascular connection, each ovum having a separate blood supply. In twins and triplets which develope from one ovum, a circulation by means of villi has been found, forming a third blood system by which the same blood passes through both fœtal hearts.

Repeated pregnancies and hereditary tendency to multiple pregnancy are the chief causes of multiple pregnancy. The diagnosis of more than one fœtus is possible only by careful attention to the details of diagnosis by palpation and auscultation. Women pregnant with more than one fœtus have naturally larger abdomens, are more liable to suffer from varicose veins and œdema, and often experience greater discomfort than in single pregnancy. When the abdomen is examined and two fœtal heart-sounds in distinctly different areas can be heard, and three greater fœtal parts, one head and two breeches, or two heads and one breech, can be plainly outlined, a diagnosis of multiple pregnancy may be made. The patient's impressions, and any less positive data, are worthless in forming an opinion. At the time of labor, when the uterus remains large, after the birth of one child, and when a second can be felt on vaginal examination,

twins may be diagnosticated. The possibility of twin pregnancy has led to the invariable custom, with careful obstetricians, of ligating the placental extremity of the umbilical cord, at labor, to prevent hæmorrhage from the placenta. The diagnosis of multiple pregnancy is not often easily made, and a positive opinion should not be given without evidence afforded by thorough examination.

Pregnancy rarely goes to full term when more than one fœtus is present. The over-distended condition of the uterus renders it more than usually sensitive to reflex irritation, and labor pains are easily excited. Abnormalities in the membranes and placentæ and polyhydramnios are often present in multiple pregnancy. One fœtus not rarely kills the other by pressing it against the uterine wall, the fœtus which perishes becoming flattened, thinned and shriveled, hence called fœtus papyraceus or parchement-like fœtus. Monsters without heads, acephalous monsters, occur in multiple pregnancies.

The position and attitude of the fœtuses in twin pregnancies are usually one presenting by the head, the other by the breech. Less often both present by the breech or head. Labor in multiple pregnancies is slow in the first stage, because the cervix dilates slowly and the lower uterine segment is not readily formed. The second stage is often short, the small size of the children rendering their expulsion easy. In the third stage the over-distended uterus may contract imperfectly and placental retention and post-partum hæmorrhage are not infrequent. If the position of both twins is not favorable for prompt expulsion, the imperfect dilatation of the cervix and lower uterine segment threaten the life of the second twin by pressure.

In conducting twin labor the obstetrician should be prepared to deliver the second twin promptly if there is but one fœtal sac; where there are two and the second is unruptured after the birth of the first twin, there is less need of prompt delivery. Twins may become so intertwined that spontaneous delivery is impossible; uterine contractions continuing and retraction of the upper uterine segment taking place, the twins become firmly fixed, and

in their abnormal position are said to be "locked." When one twin presents by the head and the other by the breech, the body of the first (breech presenting) twin may be expelled; both heads enter the pelvic cavity at once, the first head is in extension, the second flexes, and the chin of the first and occiput of the second become wedged into the pelvic brim. A similar impaction may result when both heads present. When the mother's pelvis is large, the amniotic fluid abundant and the membranes rupture suddenly while the patient is erect, prolapse of fœtal limbs and cords may result. Transverse position of one twin may also occur.

The diagnosis of multiple pregnancy is often made for the first time after the birth of the first fœtus. If the physician's suspicions are aroused he should at once make a thorough examination, if necessary introducing the greater portion of the antiseptic ized hand. If the second fœtal sac is unruptured, good uterine contractions should be secured by gentle friction and labor will proceed spontaneously. If the sac of the second fœtus has ruptured and the second twin is not born promptly, the forceps may be applied if the vertex presents; if the face presents or the shoulder, immediate version is indicated, with extraction by the breech.

In complicated presentation and prolapse of the limbs and cords, the antiseptic ized hand, introduced under complete anæsthesia by chloroform, is the most speedy and certain instrument. In locked twins, the first precaution must be to determine the condition of the uterine muscle. If the contraction be found high in the abdomen, uterine tetanus being present, the patient should be completely anæsthetized by chloroform, and a catheter having been passed and the bladder emptied, a cautious attempt should be made to dislodge impacted parts. Only the most gentle manipulation is permissible, as uterine rupture is easily produced. Failing in this, the physician must perform embryotomy on the first twin in the interests of the second. The circumstances of the case and the operator's judgment will determine just what procedure is best. We have succeeded in a

difficult case of locked twins, in which the body of one twin was born, its head being locked with that of the second, by decapitating the first twin, pushing the severed head up into the uterus, delivering the second twin by forceps and then the severed head. Thorough antisepsis and precautions to prevent hæmorrhage and secure good contraction of the uterus are imperative in these cases.

CHAPTER XXV.

THE PATHOLOGY OF PREGNANCY.

Eclampsia.—By eclampsia is understood a convulsive state on the part of the mother, caused by the circulation in the blood of irritating and noxious materials which excite the nerve centres. These irritating substances result from failure or deficient action of the organs of elimination. In different cases, one or other organ seems most deficient. In some, the kidneys are greatly at fault, in others, the liver, and in others, the intestines and skin. It is usually impossible to ascribe to any one organ the entire causation of eclamptic convulsions, but probably all of the emunctories are in a measure at fault. The clinical proof that such is the origin of eclampsia is found in the fact that patients recover best under methods of treatment which tend, while narcotizing the nervous system, to procure speedy and thorough elimination.

Eclampsia is most frequent in primagravidæ, especially those beyond thirty years old. Predisposing causes are such as produce progressive mal-assimilation with enfeeblement of the nervous system. Several causes render the pregnant woman especially liable to mal-assimilation and toxæmia from substances not thoroughly assimilated. Anatomically, the pressure of the enlarged uterus may occlude partially the ureters, thus damming up the urine, producing chronic congestion and impaired functions in the kidneys. Since attention has been drawn to a toxæmic condition as producing eclampsia, cases have been observed in which icterus, enlargement of the liver and general symptoms of ptomaine poisoning were found, indicating that failure in those functions of the liver which have to do with the production of the blood was present. It must be remembered that the kidneys are not the only organs whose

failure to perform elimination properly produces eclampsia. The practitioner must not expect to find urine loaded with albumin and casts in all cases of eclampsia. Many of the fatal cases have but a small percentage of albumin and few casts in the urine. The kidneys of a large proportion of pregnant women are engorged during pregnancy, producing what is called "the kidney of pregnancy." Serum albumin and hyaline casts are not infrequently found in the urine during pregnancy. In fact, cases in which the urine is loaded with casts and albumin not infrequently recover from eclampsia, while others, whose urine was almost free from albumin and casts, die with very little remission in the violence of their symptoms. It would seem that it is not the presence of albumin and casts, but that of ptomaines, which proves dangerous.

The diagnosis of threatened toxæmia is to be made by a careful observation of the patient's condition. The physician should *know* whether the bowels move properly; the quantity and character of urine passed; the condition of the skin, and, as far as possible, whether the lungs are bearing their share in elimination. Gentle exercise in the open air, with good ventilation in dwellings, is not to be neglected in preventing toxæmia.

The premonitory symptoms of eclampsia are those of poisoning of the nervous system; the cerebrum acts deficiently, the patient is slightly stupid, apathetic or irritable; the special senses are disordered: there are flashes of light or specks before the eyes; there is diminished acuteness of hearing; there is sometimes disordered taste or smell. Frontal headache is often complained of, and a vague feeling of lassitude and disquietude is often present. The bodily functions are sometimes performed with a fair degree of efficiency, and, again, the action of the kidneys, intestines and skin is somewhat below the average. Just preceding the attack it is not uncommon for the cerebrum to be considerably benumbed, so that a patient may enter a hospital on the verge of an eclamptic seizure, and afterward be unable to recall any circumstances connected with her admission.

The eclamptic seizure comprises tonic and clonic spasms.

The expression of the patient's face becomes suddenly staring and unnatural, the muscular system is thrown into a tonic spasm, a deep breath is taken, followed by clonic spasms, often sufficiently powerful to shake a patient's bed and exhaust her greatly. The jaws are clinched, the tongue may be bitten between the teeth, and, as the stage of clonic spasms ceases, froth and mucus from the trachea and bronchi gather about the mouth and nostrils. Following the clonic spasms, a period of coma supervenes, of greater or less duration. After this the patient may become conscious until the advent of the next eclamptic fit.

As the spasms are repeated, the tremendous muscular activity of the clonic stage produces exhaustion and rapid decomposition of the muscle substance. The products of this decomposition, added to the poisonous materials already circulating in the patient's blood, increase the violence and extent and duration of her spasms. The uterus is generally excited to activity, and uterine contractions bring on labor, which is frequently rapid and violent. The fixation of the diaphragm and distension of the lungs, during the stage of spasms and coma, favor pulmonary œdema. From the same causes cerebral congestion supervenes. The nervous system, excited and depressed by the poisonous materials circulating in the blood, becomes gradually exhausted, and paralysis of the heat centre is followed by a rise in temperature. Paralysis of the sympathetic causes excessive cardiac action, with rapid pulse and subsequent exhaustion and heart-failure. Arterial tension is increased by the irritation of the altered blood until the stage of paralysis and exhaustion is reached, and the arterial wall loses much of its contractile force. Cerebral œdema and effusion into the ventricles of the brain assist in overcoming the nervous system. Death results in deep coma, with progressive failure of the vital nerve centres. Other causes of death occurring during or after eclampsia are, exhaustion, septic infection and sudden heart-failure with development of heart-clot.

Treatment.—The treatment of eclampsia resolves itself into prophylaxis, and the treatment of the patient during the convul-

sions. From what has been said, it can readily be understood that the prophylactic treatment must be addressed to furthering and maintaining a proper elimination. It should be the invariable custom of the physician to examine the urine of patients at intervals of two or three weeks during pregnancy. Especial attention should also be given to the regular and proper action of the intestines and skin, and nutritious and easily assimilated diet should be advised, with the avoidance of unusual and prolonged exercise and exposure to damp and cold. The practitioner should remember that the presence or absence of albumin in the urine is not of great significance as regards the occurrence of eclampsia. The most valuable method of studying the condition of the kidneys is by a microscopic examination of the urinary sediment. Should granular or fatty casts be found and should they persist, and albumin also be present, there can be no doubt but that the kidneys are at fault.

The diet best adapted for patients threatened with eclampsia is milk. It is often difficult, however, to restrict patients to this only, as many soon acquire an intense disgust for this article of diet. Highly nitrogenous foods should be avoided, and also an excess of sugar and fat and any substance liable to derange the action of the liver and intestines. If the patient cannot be restricted to milk, soft-boiled eggs, fish, white meat of fowls, fruits, vegetables, stale bread and the use of an abundance of soft drinking water should be advised.

To secure proper action of the intestines, it will often be necessary to prescribe laxatives. Salts should be avoided, as it has been ascertained that potassium salts especially act as irritants in the blood in these conditions and hence favor convulsions. Colocynth, senna, compound licorice powder, with the occasional use of small doses of calomel, are indicated. Glycerine and gluten suppositories and occasional enemata may be employed to assist in keeping the bowels regular. The action of the skin should be maintained by frequent bathing in tepid or warm water. The fabric worn next to the skin should be woolen to promote a constant and free circulation of blood in the skin, thus tending

to relieve the viscera from congestion. Alcoholic liquors should be avoided as beverages, and also the use of tea and coffee in excess, and any narcotic substance. The patient will avoid prolonged and fatiguing exertion, such as difficult journeys, and, if possible, should pass her pregnancy in a dry and equable climate.

In proportion as the severity of the symptoms increases, the practitioner may employ more active measures to secure elimination. The best of these consists in arousing the activity of the skin vigorously by the use of a hot bath. The patient should be in a tub of water at a temperature of 80 or 90, and the temperature be then raised until the limit of endurance is nearly reached. While in the bath she should drink freely of hot water, and after leaving the bath she should lie wrapped in blankets for a couple of hours.

There is no one drug of value as a preventer of eclampsia, and the temptation to prescribe sedatives and narcotics should be strenuously opposed, while the cause and pathology of the condition will give the practitioner an accurate guide for treatment in the indication to further and maintain elimination.

The treatment of eclamptic convulsions consists first in so narcotizing the patient as to modify the violence of the convulsions, thus preserving the nervous system from rapid destruction, and in securing prompt and thorough elimination. Two narcotics are of especial value, chloroform and chloral. Morphia is also often employed, and has been used with the best possible results. The administration of chloroform is of primary importance, as no other narcotic so promptly controls the convulsions. If possible, the task of giving chloroform should be intrusted to one person only, who should sit beside the patient, ready to administer the anæsthetic at the slightest indication of the convulsion. To prevent the patient from biting her tongue, a folded handkerchief or napkin should be placed between the jaws. A clean handkerchief or napkin may be used as an inhaler, and sufficient chloroform be poured upon it to secure a speedy and positive effect. Chloral may be given by rectal injection in doses of 30 or 40 grains, repeated at intervals of two or three hours, until from 60 to 90

grains have been taken. Morphia may be administered hypodermically in doses of one-fourth or one-half a grain, and in combination with atropia when a tendency to respiratory failure is present.

The subduing the violence of the paroxysms, however, will be useless to save the life of the patient unless prompt elimination is secured. This is best done by the employment of the hot bath in the following way: the patient is raised upon the sheet on which she lies, and both are placed in a tub of water at a temperature of 90. Sufficient ground mustard to redden the patient's skin should be thrown into the water, and the temperature of the bath should be raised rapidly until the tolerance of those whose hands are in the bath has been reached. If symptoms of heart-failure present themselves, digitalis may be given hypodermically while the patient is in the bath. Ordinarily, fifteen or twenty minutes will suffice to keep the patient in the bath. The patient's skin should also be rubbed, and when the skin is thoroughly reddened she should be taken from the bath upon the sheet, a blanket wrapped hastily about her, and laid upon a bed covered with a rubber blanket. Woolen blankets should then be added in abundance, with hot cans at the feet and about the thighs; after a few moments the patient's forehead will be seen to be moistened by perspiration, which will usually become profuse in a short time. Meanwhile, a rectal injection of chloral may be given, and morphia used hypodermically if needed.

To secure elimination in desperate cases, a drop of croton-oil mixed with olive-oil may be placed upon the tongue. It will usually be better, however, if the patient can swallow, to employ calomel as a diuretic and also as a purgative. For this purpose, ten grains of calomel with an equal quantity of soda should be swallowed as soon as possible. This dose should not be repeated but once in thirty-six hours. It may be followed an hour afterward by a laxative injection. The practitioner, meanwhile, should observe carefully the patient's pulse and temperature. If she be threatened with heart-failure, digitalis and ammonia may be given by hypodermic injection. If the pulse continues to

rise, remaining above 100, the prognosis becomes correspondingly grave as the case proceeds. It is not unusual to observe a temperature of 103 or 104° F. in these cases, usually falling under the influence of the hot bath. If stimulants are required, whiskey and milk, two ounces of each, may be warmed and given by rectal injection. In apoplectiform cases where plethora is excessive, bleeding may be practiced with marked temporary benefit. No permanent improvement can be expected, as this expedient will not exercise more than a temporary influence upon the patient.

The effect of eclamptic convulsions is usually to bring on labor. If the convulsions be violent the uterine muscle often shares in the general muscular activity. Labor is sometimes rapid and precipitate. When the practitioner finds that labor has commenced, he will do well to further its completion. Thus, when dilatation is sufficient, the forceps may often be used to advantage, or version may terminate the labor. If, however, dilatation is not complete, and no signs of labor are present, no effort should be made to forcibly dilate the cervix and empty the uterus. Such a procedure would simply add to the reflex excitability of the general nervous system, and further a fatal result for the mother and child. After labor the convulsions may continue, although this is exceptional and not the rule.

The prognosis of eclampsia has improved since our knowledge of the pathology of the affection has become more accurate. While formerly more than one-third of all eclamptic patients died (33⅓ per cent.), under treatment planned upon indications furnished by the pathology of the affection, but one-thirteenth (7½ per cent.) died. Eclampsia occurring during the first stage of labor is more fatal than that which comes on before labor has begun. The death of the child before labor begins improves the mother's chances, probably by removing a source of uterine irritation in fœtal movements and the waste products of fœtal digestion.

In eclamptic patients an occasional error may arise through the existence of hysteria complicating nephritis. Thus, in a

recent case in which nephritis was well marked, the patient was observed to have paroxysms simulating eclamptic seizures. A few moments' careful observation detected the evident counterfeit. It is interesting to observe that although this patient had well-marked nephritis, she never had a genuine eclamptic seizure.

Epilepsy may simulate eclampsia very closely. The examination of the urine and the results of treatment will usually enable the obstetrician to make a differential diagnosis.

The prognosis for the child in eclamptic cases is rendered unfavorable through the usual rapidity and precipitateness of the labor. In spite of all this, however, children are frequently born and live after labor occurring during eclamptic convulsions. A mother who has had eclampsia should not nurse her child.

Nephritis Occurring during Pregnancy.—While toxæmia and eclampsia are well recognized conditions, it has been customary to ascribe all eclampsia to kidney failure. This is but partially true, and nephritis during pregnancy is to be recognized as an affection distinct from toxæmia and eclampsia, although predisposing to them. The causes producing nephritis in the non-pregnant operate more readily during pregnancy, from the burdened condition of the mother's emunctories owing to the demands of the fœtal economy; exposure to wet and cold, poor and improper food and the causes which produce an altered and irritating blood, resulting in arterial disease and ultimately kidney failure, commonly cause nephritis. The symptoms are those usually observed, casts and albumin in the urine, with œdema, lessened amount of urine and uræmia.

A point of especial interest to the obstetrician is the relation which nephritis caused by disease of the arterioles of the kidney bears to the life of the fœtus. While the pathology of the condition is not perfectly demonstrated, yet observation seems to show that while the arterioles of the mother's kidneys are becoming gradually occluded by diseased products, a similar change is going on in the small vessels of the placenta. This process gradually occludes areas in the placenta, thus robbing the fœtus of portions of its

blood supply and gradually causing death by asphyxia. In the interests of mother and child, a time must come when the induction of labor is justified in the interests of both. Women having well marked nephritis are not apt to recover perfectly after labor and are more liable to eclampsia; the fœtus of such a mother often dies in the uterus before labor comes on, or perishes soon after birth. It is difficult to determine the exact time at which to induce labor, and this can be known only from an accurate and prolonged observation of the case. But it is certainly true, in the present stage of our knowledge, that pregnancy should be interrupted in a patient having well-marked symptoms of nephritis which do not abate on treatment.

The treatment of nephritis during pregnancy does not differ from that in the non-pregnant. The warm and hot bath; proper hygiene; laxatives which produce free, watery stools; the use of pure, soft drinking water are the ground work of treatment. It should be remembered that it is not the amount of serum albumin in the urine which indicates danger, but casts and kidney *débris*, and hence careful microscopic examination of the urine is more valuable than chemical tests.

CHAPTER XXVI.

INFECTIOUS AND CARDIAC DISEASE DURING PREGNANCY.

The Acute Infections Occurring During Pregnancy.—Great interest has attached to the acute infections since bacteriology has thrown new light upon the causation of such maladies. The question naturally suggests itself, can the germs causing the acute infections pass through the villi of the chorion and the inter-villous placental septa and infect the fœtus as well? At the present time an affirmative answer can be given to this question as regards typhoid infection, malaria, pneumonia, syphilis, tuberculosis and gonorrhœa. It is also stated that cholera and yellow fever are transmitted from mother to child, the latter in such a manner as to convey immunity from subsequent attacks upon the fœtus which survives, while in the uterus, an attack of the disease.

The exanthematous infections are conveyed to the fœtus, variola, measles, scarlatina, and erysipelas frequently causing fœtal death, before or after delivery.

It seems to have been demonstrated that pregnancy neither exempts or exposes a woman to the acute infections. She incurs greater dangers than the non-pregnant from abortion, from hæmorrhage and from the fact that in some of the infections mentioned, as variola, scarlatina and erysipelas, the micrococci which cause puerperal pyæmia frequently develop in company with the germs of the original infection, and hence puerperal sepsis is added as a complication.

The symptoms of these diseases in pregnancy do not essentially differ from those in the non-pregnant. The symptoms of abortion are likely to be added to those of the original infection, and should not fail to attract the physician's attention. As

regards prognosis, if the patient's temperature does not remain long at or above 104° F. her chances and those of the fœtus are not desperate so far as fever is concerned. The occurrence of abortion is unfavorable; a premature labor is not especially dangerous. The prognosis of abortion or premature labor occurring during an acute infection will be greatly influenced by the observance or disregard of antiseptic precautions. As there is, in these cases, especial danger of the development of micrococci, so there is indicated especial precaution. If hæmorrhage be prevented, the patient's strength be conserved, and sepsis does not complicate the case, a better prognosis can be given than would otherwise be justifiable.

The treatment of the acute infections during pregnancy is that proper in the non-pregnant, with especial attention to the reduction of temperature. No theory or method of treatment appropriate in such cases is contra indicated because of pregnancy, but whatever will best further the mother's interests will be best for the child. Quinine may be given freely during malarial infection without fear of producing abortion. When abortion or labor has begun, quinine, in common with many tonics acting upon the nervous system, is most efficient in strengthening the contraction of the uterus. It will rarely cause abortion or labor before such a process has actually commenced. Stimulants may be used as freely as needed with the best results. Abortion should not be intentionally produced, as it increases the mother's dangers.

In variola and syphilis, preventive medication may be employed advantageously for the interest of the fœtus. Vaccination should be performed so soon as variola is suspected, and pregnancy is no counter indication to vaccination in all cases. The prompt use of mercury in recent syphilitic infection is demanded in the interests of the fœtus. Preventive inoculations with tuberculin do not as yet give promise of success in threatened fœtal tuberculosis. Gonorrhœal infection during pregnancy demands prompt treatment. The vagina should be thoroughly douched with a solution of bi-chloride of mercury,

one to one thousand, followed by boiled water. Iodoform is then to be thoroughly applied to the mucous membrane, a tampon of iodoform gauze, which distends the vagina moderately, is especially useful. Injections may be given to advantage through a cylindrical speculum. The early destruction of the gonococci is desirable, as they tend to nest in the folds of the vaginal mucous membrane, and thus infect the mucous surfaces of the fœtus during labor. They also threaten the mother with infection of the urinary tract. Continued gonorrhœal inflammation during pregnancy causes in many cases adherence of the fœtal membranes to the cervix and os; at labor premature rupture of the membranes results, and a tedious and difficult labor may follow.

Cardiac Disorders During Pregnancy.—The physiological changes occurring in normal pregnancy tend to exaggerate a diseased condition of the heart before pregnancy. The tax put upon the mother's circulatory system by the needs for fœtal nutrition favors, in advanced cardiac lesions, failure in nutrition in the hypertrophied heart muscle and dilatation occurs, increasing to a dangerous degree during labor. If the valvular lesion be slight, compensation may be maintained, and no immediate harm follow pregnancy and labor. Repeated pregnancies and labor should be avoided; in fact, women with well-marked cardiac lesions should not become pregnant. During pregnancy violent exertion must be avoided, and chilling the surface of the body. The clothing should be perfectly loose; the skin, bowels, kidneys and lungs should be kept in proper activity. The nutrition of the heart muscle is to be maintained by attention to nutrition, with the use of cardiac tonics. The sensation of breathlessness, which so often annoys pregnant women, should be explained to the patient, and should not be allowed to cause undue apprehension. The physician will inform himself by physical examination of the actual condition present. At labor the patient's dyspnœa is best relieved by the hypodermic use of ether, atropia, strophanthus or digitalis and strychnia, with inhalations of chloroform or ether. If possible, oxygen should be in readiness for inhalation. Labor may be judiciously

expedited by forceps or version. Hæmorrhage is to be feared, and possible thrombosis after delivery. The relief afforded by anæsthetics in cases of labor with advanced valvular lesions is surprising and immediate. In common with other disorders, cardiac lesions are not incurred by pregnancy, but are aggravated by it. Endocarditis, caused by rheumatism, is most frequent, atheroma and aneurism are less commonly observed than in men.

The occurrence of failure of nutrition in the heart muscle, with beginning dilatation, may justify the production of abortion.

CHAPTER XXVII.

AFFECTIONS OF THE GENITO-URINARY ORGANS OCCURRING DURING PREGNANCY.

THE condition of pregnancy predisposes to inflammation of the mucous membrane of the vagina and cervix. Simple engorgement, with increased secretion of mucus, is almost a constant condition of the vaginal mucous membrane. Unless precautions are taken to insure cleanliness, micrococci will breed in the decomposed secretions, and inflammation and ulceration will result. The symptoms of such conditions are vaginal discharges, and pain and irritation upon micturition and walking. Treatment should be addressed first to destroying micrococci and next to maintaining a condition of cleanliness by vaginal injections. Bichloride of mercury, 1 to 5000 or 2000, will be useful at first, to be followed later by injections of boric acid or alum in dilute solutions. The treatment of gonorrhœa has been considered under the acute infections.

When micrococci invade the bladder, a trying complication of pregnancy, and one likely to occasion trouble after labor, is present. Urethritis, cystitis, pyelitis and suppurating kidney have all followed this accident. When pus is found in the urine the bladder should be douched twice daily with creoline solution, a teaspoonful to the pint of warm water. Internally salol may be given, 10 grains three times daily, or boracic acid 15 to 20 grains three times daily. Milk diet, if possible, with rest in bed and careful disinfection of the vagina, will also be of advantage. It is of interest to note that cystitis of moderate degree may be present with an acid urine in the case of women. In pyelitis, catheterization of the ureters is of value to determine which

kidney is affected: in severe and prolonged cases lumbar incision and drainage of the kidney are indicated.

Displacement of the uterus and vagina are among the complications of pregnancy. Prolapse of the vaginal walls is usually the result of repeated parturitions, with a relaxed condition of the tissues.

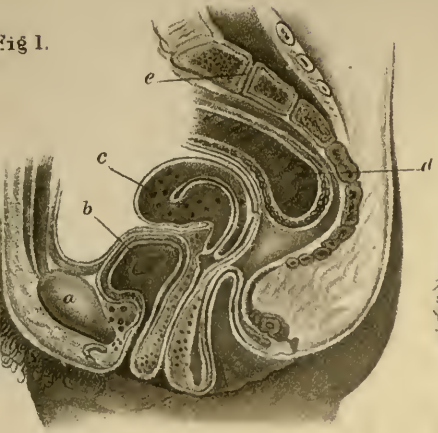
Prolapse of the uterus may occur early in pregnancy, accompanied by endocervicitis; although previous distension of the vagina during labor is an exciting cause, it may be observed in primagravida. Its symptoms are sensations of weight and dragging, the presence of a tumor, with interference with the functions of the bladder and rectum. Abortion may result if the case be neglected, with septic infection following it.

Replacement of the prolapsed organ and its retention in its normal position can usually be effected by manipulation. An antiseptic tampon is a convenient and efficient agent for retaining the uterus in its normal position. Surgeons' lint, in strips three inches wide, smeared with an antiseptic ointment, is a useful material for tampon. Hard and elastic pessaries are not contraindicated in these cases. In extensive prolapse of the vaginal walls, with laceration and erosion of the cervix, colporrhaphy and trachelorrhaphy may be performed without fear of abortion, if undue violence be avoided and antiseptic precautions be taken to secure union by first intention.

Retro-Displacement of the Pregnant Uterus.—It is not uncommon for the uterus to tip backward early in pregnancy. The frequency of backward displacements in the non-pregnant, tight clothing and corsets worn during pregnancy, and relaxation of the supports of the uterus as its weight increases, have all been alleged as causes of this condition. Between the third and fourth month, when the uterus rises out of the pelvis, such a displacement is usually spontaneously corrected; if inflammation and adhesions exist, binding the uterus down, abortion or death of the fœtus and impaction of the uterus in the hollow of the sacrum will result.

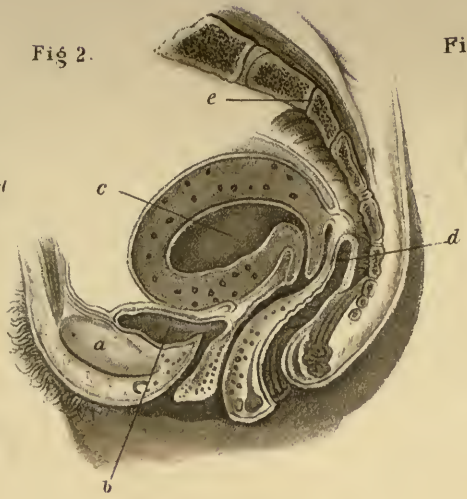
The symptoms of retro-displacement of the pregnant uterus are

Fig 1.



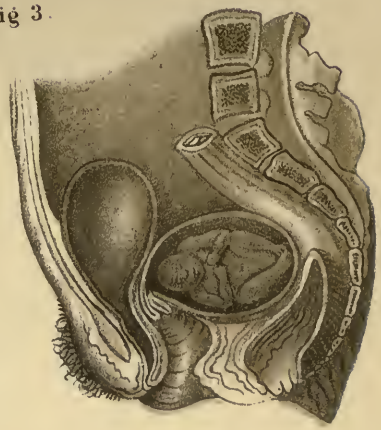
Marked anteflexion of the Uterus.

Fig 2.



Anteflexion of Uterus soon after delivery.

Fig 3.



Retroversion of the Gravid Uterus at the Fourth Month. (Diagramatic)

Flexions and Retroversions of Uterus. 1. (Martin)

frequent and irritating micturition, constipation, and pain over the sacral and gluteal regions. Digital examination will confirm the physician's suspicions.

The treatment of this complication of pregnancy, in mild cases, consists in emptying the bladder and rectum, anteverting the uterus by pressure with the fingers in the vagina or rectum, and fitting a pessary, either of hard rubber or some softer material, to retain the uterus in position. In replacing the uterus, violent manipulation must be avoided; if the patient be placed in the knee-chest posture the uterus will generally go easily into place. A support will not be needed after the fourth month, when the uterus has risen above the pelvic brim.

In impaction of the pregnant uterus in the hollow of the sacrum, persistent but gentle efforts are needed to dislodge it from its abnormal position. The cervix may be grasped by a tenaculum forceps and drawn downward and backward, while with the fingers of the other hand an effort is made to dislodge the fundus. If the uterus cannot be replaced, its size must be lessened by producing abortion; this is best accomplished by introducing a sound, rupturing the membranes. When the uterus is bound down by adhesions, impacted in the hollow of the sacrum, and death and decomposition of the fœtus ensue, the condition is one of gravity. The obstetrician is then obliged to forcibly break up such adhesions, replace the uterus and empty and disinfect its cavity. The uterus has been extirpated through the vagina for the relief of this condition, with success.

Anterior Displacement of the Pregnant Uterus.—In women whose abdominal walls are ill developed, weakened by many pregnancies, and in pregnant women having contracted pelves so small that the uterus cannot enter the pelvic cavity, exaggerated ante-version of the pregnant uterus has been observed. Its symptoms are interference with the function of the bladder, first frequent micturition, then infrequent difficult micturition, and finally the retention of the contents of the bladder with almost constant dribbling of urine. The abdomen protrudes as the uterus grows larger, until the German term of "hanging

belly" seems appropriate. Pain and "dragging" are felt in the sacral region.

The diagnosis of the condition is readily made by examination after the bladder has been emptied by a catheter. In early pregnancy a ring pessary will usually correct the malposition; later in pregnancy a broad abdominal band will be found useful.

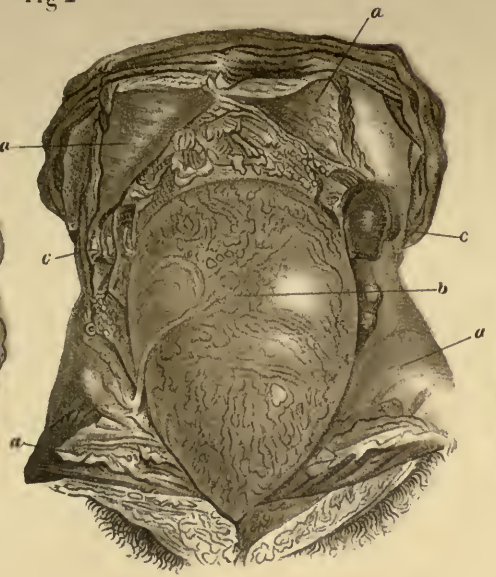
Relaxation of the Pelvic Joints is an occasional complication of pregnancy. Although these joints become more vascular, and contain more synovial fluid than in the non-pregnant, it is rare for their mobility to become excessive. The pubic joint is most affected in these cases, and can be felt to move freely when the patient steps. Walking may become impossible, and standing be scarcely endured. There is no one cause which seems responsible for this condition, and hence no treatment except mechanical devices for partly immobilizing the joint is of avail. The application of a broad, well fitting bandage of strong material, passing around the entire pelvis from the trochanters above the crests of the ilia, is usually efficient. A plaster-of-Paris bandage has been necessary in severe cases, and in others rest in bed.

The Nervous System.—Pregnancy affects the nervous system, often profoundly. The reflexes are exaggerated; the trophic and secretory nerves are more active, and more easily excited. The brain shares in the generally sensitive condition of the patient, and the pregnant woman is often easily frightened, irritable and usually apprehensive. A generally stimulating effect is observed with others, and such women feel better than when not pregnant. Such patients have better appetite and digestion than before pregnancy. The sensitive condition of the sympathetic nervous system causes cardiac palpitation, dyspnœa, flushing of the features and often perspiration on very slight provocation. Salivation, discoloration of the skin about the face and often the genital organs, and, in many cases, excessive nausea and vomiting, are all to be referred to hyperæsthesia of the various portions of the nervous system, caused by pregnancy.

Fig 1

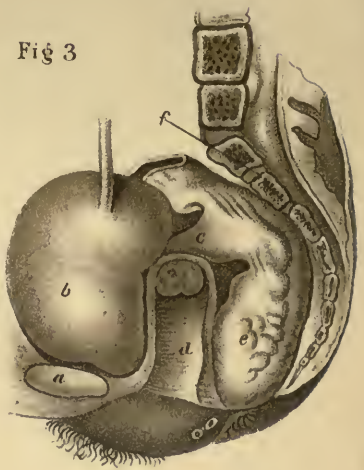
Retroversion at Commencement of Fifth Month with Destention of Bladder.

Fig 2



Destention of the Bladder by retained Urine. Consequent upon Retroversion

Fig 3



Retroflexed Uterus bound down to the Rectum by Exudation Membrane.

Flexions and Retroversions of Uterus. II. (Martin)

The extremes of these nervous affections are seen in chorea and insanity, recurring during pregnancy. It is rare that either is caused by pregnancy, but results in a pregnant woman predisposed to either of them. The treatment of chorea in the pregnant woman is essentially that in the non-pregnant. Abortion should be resorted to only when other remedies have failed, and premature labor in the choreic rarely terminates spontaneously. Arsenic and other tonics to the nervous system act very favorably in these cases, especially when accompanied by disciplined nursing.

In a woman predisposed by heredity to insanity, pregnancy not infrequently developes melancholia, with acute mania at labor. In those not predisposed to insanity, pregnancy may be accompanied by melancholia persisting for some time after delivery, but rarely followed by mania.

Labor in the actively insane demands careful attention. Such patients are often strangely oblivious to pain, and labor may proceed without demonstrations of suffering. Anæsthetics and sedatives are required in these cases and delivery should be conducted under complete anæsthesia. Constant watchfulness is to be exercised, for suicidal tendencies and efforts to injure the child are not infrequent. Judicious, kindly restraint is imperative in these cases, and the physician may find his strength and patience taxed to their utmost. It is sometimes necessary to partially anæsthetize the patient to give even a douche. The prognosis in those not predisposed to insanity is good, under long-continued and rational treatment. Seclusion, tonics, cheerful and assiduous kindness, and the presence of the child usually cure these cases. In those with whom insanity was to be feared, pregnancy is simply the exciting, but not the predisposing cause, any one of many might have precipitated mental disease. The prognosis for recovery in such cases cannot be given as hopeful.

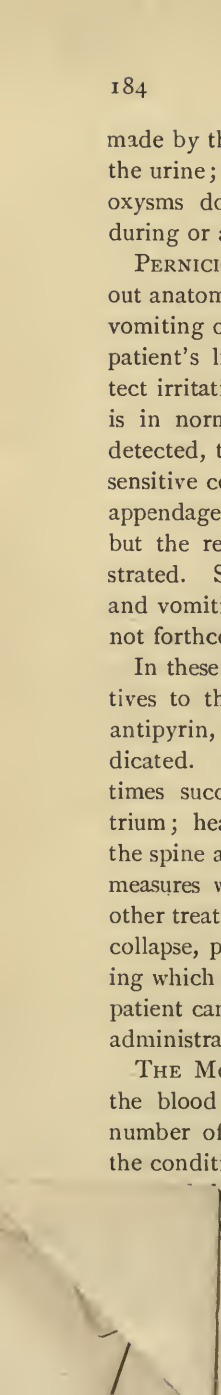
Hysteria and epilepsy are neither caused nor greatly aggravated by pregnancy. Both are to be treated as in the non-pregnant. Hysteria may deceive the practitioner by simulating labor and even eclampsia; close observation will detect the deception. The diagnosis between eclampsia and epilepsy will be

made by the history, when available, and by the examination of the urine; the epileptic has had fits before pregnancy, her paroxysms do not grow more frequent or violent; she rarely dies during or after labor.

Pernicious Vomiting of Pregnancy.—In some cases, without anatomical lesion to account for the disorder, the nausea and vomiting of pregnancy become so exaggerated as to threaten the patient's life. When the examination of the patient fails to detect irritation or inflammation about the uterus; when the womb is in normal position, and no gastric or kidney disease can be detected, the cause of the nausea must be ascribed to a hypersensitive condition of the nervous system. Disease of the fœtal appendages has been found in some cases of pernicious vomiting, but the relationship of cause and effect has not been demonstrated. Some observers have made hysteria the cause of nausea and vomiting, although proof that such is invariably the case is not forthcoming.

In these cases remedies are most successful which act as sedatives to the nervous system. The bromides, chloral, morphia, antipyrin, antifebrin or phenacetin, cocaine or valerian are indicated. Chloroform, internally and by inhalation, is sometimes successful. Locally, counter-irritation over the epigastrium; heat to the cerebrum and cerebellum; galvanism along the spine and epigastrium, or an ice-bag upon the abdomen are measures which have been of value in different cases. When other treatment is unavailing, and the patient is threatened with collapse, pregnancy must be terminated. Every method of feeding which modern nursing can suggest should be exhausted; the patient can be nourished by the rectum for some time, by the administration of nutrient enemata.

The Mother's Blood During Pregnancy.—The view that the blood becomes more watery during pregnancy, with a large number of white corpuscles, is probably not true. Aside from the condition of anæmia which follows the expulsion of the fœ-



...e loss of blood so often seen during labor, the healthy ...oman may be said to be in a condition of slight ple-

thora, and not anæmia. Pernicious anæmia is observed at times, and forms a serious complication of pregnancy. The symptoms of this condition are pallid skin; rapid pulse, dyspnœa; lassitude and often œdema. Microscopic examination of the blood reveals a much lessened quantity of hæmoglobin; red corpuscles which are smaller and less perfectly formed than normally; and threads of fibrin stretching across the field of the microscope. Blood counts show a lessened number of red corpuscles; lessened hæmoglobin percentage; sometimes increased number of white cells. When not pregnant, these patients are simply chlorotic; at labor hæmorrhage is very slight, the labor pains often deficient, and delivery instrumental. The child is pale, chlorotic and of feeble vitality. In other cases the child is strong, its blood being found normal on microscopic examination.

The treatment of this condition is best accomplished by the persistent administration of oxygen by inhalation, and arsenic in small doses, with nourishing food. Peptonized milk, soups, broths, raw meat in finely chopped and seasoned preparations, and eggs are of especial value. The importance of oxygen and arsenic must be emphasized, as they are superior to iron and other drugs.

JAUNDICE in parturient patients may be hepatogenic or hæmatogenic. The former is caused by catarrh of the bile ducts, with occlusion of the ducts and absorption of bile. It usually accompanies enteritis, and yields to treatment addressed to the secretion of bile and the intestinal tract.

Hæmatogenic jaundice results from an acute infection affecting the red blood corpuscles and causing their disintegration, with absorption of hæmatin. Acute yellow atrophy of the liver accompanies profound, malignant jaundice, and is considered by some to be caused by the same infection. Hæmatogenic, infectious jaundice is but little amenable to treatment; stimulants and tonics are indicated to enable the patient to resist the infection.

DISORDERS OF THE SKIN DURING PREGNANCY. — Pregnant women are often greatly annoyed by discoloration of the skin about the face and genital organs; the facial blemish is known as the "mask of pregnancy," and is usually of a yellowish-brown

color. It is not amenable to treatment and usually disappears after delivery.

Pruritus about the genital organs occasions great suffering in some cases. Thorough cleanliness must be first secured. Hot or cold sponging; sitz baths of warm, but not hot water; anæsthetics, locally applied, and the galvanic current have all been employed. But little more than palliation can be expected until the termination of pregnancy.

Varicose Veins.—Few women pass through pregnancy without dilatation of the veins of the lower extremities, and often the vulva and vagina. Rupture of varicose veins of the vulva and vagina often results in the extravasation of blood into the submucous tissue, without admitting the external air. When dilatation is excessive, rupture may take place at labor or when very slight violence is offered, and free hæmorrhage result. The recumbent posture and the use of an antiseptic tampon will control such hæmorrhage.

Varicose veins of the lower extremities occasion great discomfort when distension is excessive, and sudden and alarming hæmorrhage follows rupture. Before rupture, itching and burning sensations and often an eczematous eruption add to the patient's discomfort. Patients suffering from varicose veins should avoid constipation, and can often derive comfort from some form of support. An elastic stocking or flannel bandage, with frequent bathing in a saturated solution of boracic acid, will often be of great service. Such patients should be instructed in the application of a compress and bandage, and cautioned to avoid rupture of a vein if possible. Garters and clothing which interfere with the circulation in the lower limbs should not be worn.

Hernia of the Pregnant Uterus.—In rare cases the pregnant uterus protrudes in the umbilical, crural, or inguinal ring. In umbilical hernia reposition is usually not difficult, and the uterus is retained by an abdominal bandage. Abortion or Cæsarean section, if the fœtus be movable, is indicated in these cases, with removal of the uterus if it cannot be returned to the abdominal cavity.

Narrowing of the Vagina by an Ovarian Tumor.
(Martin)

f.f. Vaginal Walls. *d.* Ovarian Tumor. *e.e.* Rectum. *c.* Urethra.

Pregnancy Complicated by Foreign Growths in the Uterus and Pelvis.—Fibroid tumors of the pregnant uterus usually grow softer and larger as pregnancy progresses. A fibroid polyp which protrudes from the os may be removed, but a less easily accessible tumor should not be disturbed. Cancer of the cervix of the pregnant uterus is to be removed as in the non-pregnant. Abortion is not inevitable upon operation in such cases, and the patient should not be allowed to suffer by delay.

Still more imperative is the obstetrician's duty in pregnancy complicated by ovarian tumors. So soon as a diagnosis can be made such a tumor should be removed. Under antiseptic precautions the prognosis for recovery and continuation of pregnancy is excellent.

CHAPTER XXVIII.

THE SURGICAL TREATMENT OF COMPLICATED LABOR.

It is sometimes necessary to terminate labor by a resort to surgical operations. Such operations have for their object the saving of the life of the mother and child, or saving the life of the mother at the sacrifice of that of the child.

Under the first heading may be included the Cæsarean section, and amputation of the pregnant uterus. By Cæsarean section is understood an incision into the abdomen, an incision into the uterus, the extraction of the child with its placenta and membranes, and the closure of the uterus by suture. This operation is of great antiquity, taking its name from the Roman Cæsar who is said to have been born in this manner. Since antiseptic surgery has attained its present perfection, this operation has been revived with excellent results.

The indications for the Cæsarean section deserve especial consideration. The child must be living and viable; the mother must not be infected by septic infection, nor can her uterus be the seat of a pathological process which would prevent a uterine incision from healing. There must be such disproportion between her birth-canal and the size of her fœtus that the delivery of the latter alive is impossible. The consent of the mother, or, in the event of her being unconscious, of her nearest relative, must be secured. When these conditions are present the success of the operation will depend upon three grounds:

1st. A knowledge and faithful application of antiseptic precautions.

2nd. The co-operation of at least one intelligent assistant.

3d. Adequate closure of the uterine incision.

In regard to the first, the operator should thoroughly antisepti-

cize his hands, instruments and appliances. The abdomen of the patient should be scrubbed with soap and water, washed with ether and then with a solution of bi-chloride of mercury, one to one thousand. No antiseptic fluid should be introduced within the abdominal cavity. If it is necessary to wash out the abdomen, it should be done with boiled water at a temperature of 100. If the interior of the uterus is found in a condition requiring disinfection, this can best be accomplished by tamponing it with iodoform gauze, the ends of the tampon emerging through the vagina. The assistant, whose co-operation is essential, has for his function compression of the uterus to prevent hæmorrhage. He should also observe the strictest antiseptic precautions by especial attention to cleansing his hands.

The question of the method of closing the uterine incision has occasioned much discussion, and seems finally to have reached a satisfactory solution. When the Cæsarean operation was revived by Sænger, it was thought necessary to close the muscular tissues of the uterus, and also the peritoneum covering that organ, by a separate line of sutures. While this is undoubtedly a safe and correct method of operating, yet others have performed the operation successfully by including the peritoneum and muscular tissue in one suture, approximating the edges of the incision with great care. As first performed, the sutures during the operation were not passed through the decidua lining the uterus, but in various operations this has been included in the sutures without disastrous results. It is of the greatest importance, however, that a sufficient number of sutures be used to solidly approximate the edges of the incision. It is of paramount importance that the edges of the peritoneum covering the uterus be brought carefully into apposition so that they may unite perfectly.

The material employed for sutures may be silver wire, catgut, or silk. If catgut be employed, none but the best quality should be used, as otherwise septic infection or loosening of the edges of the incision may result disastrously to the patient. If possible, the patient should be prepared for operation in the manner usual before all abdominal sections. No solid food should be taken

for a day before the operation, the bowels should be thoroughly emptied, several antiseptic vaginal douches should be given, and if a suspicious discharge from the uterus persists, the vagina should be tamponed at the time of operation with iodoform gauze. Beside the chief assistant already mentioned, two others will be found useful, with a trained nurse. One of the assistants should give the anæsthetic, the other should be ready to devote his entire attention to the resuscitation of the child.

The instruments needed are a scalpel, several pairs of hæmostatic forceps, two sizes of curved needles, a needle-holder, and a piece of stout rubber tubing as large as the little finger, two or three feet in length. If the patient have no bronchitis or disease of the kidneys, ether may be employed as an anæsthetic, but should either of these complications be present, chloroform may be used. At the time of operation, the nurse should have ready bottles filled with hot water; whisky or brandy, digitalis, aromatic spirits of ammonia, fluid extract of ergot, or a solution of ergotine especially prepared for hypodermic injection, and a solution of morphia. The usual basins and pitchers for washing sponges and for irrigating the abdominal cavity should be in readiness. It is well to have also a fountain syringe with a suitable tube for giving a vaginal douche. In addition, there should be in readiness a small tub filled with hot water for use in resuscitating the child. The patient having been anæsthetized, the chief assistant stands beside the operator with the rubber tubing already mentioned within convenient grasp. The operator will desire to incise the uterus upon its anterior aspect about midway between the fundus and the lower uterine segment. The period of labor chosen for operation is preferably the end of the first stage when dilatation is nearly complete. An abdominal incision of from three to five inches should then be made over the portion of the uterus which the operator wishes to enter. The peritoneum having been incised, two courses are then open for the operator; one is to enlarge the incision sufficiently to turn the uterus forward out of the abdominal cavity; the other is to incise it as it lies in the abdomen. If the uterus is turned out, towels which

have previously been boiled and wrung out of freshly boiled warm water should be laid over the intestines behind the uterus and upon the abdomen so that the uterus may rest upon them.

Two methods of checking hæmorrhage are available at the time of the uterine incision. One consists in drawing the elastic tube tightly about the uterus at the junction of the cervix and the body; the other is grasping the uterus with both hands at the region indicated, while the incision is made. The former procedure was followed by Sænger with good results; the latter has been successfully employed upon several occasions. When the uterus has been exposed, and the site of the incision determined, and when the chief assistant is ready to check the hæmorrhage either by the tubing or by his hands, the operator opens the uterus by an incision from three to four inches in length, ruptures the membranes, feels for one of the fœtal limbs, and extracts the child as soon as possible. The cord should be immediately tied and cut, and the child given to a second assistant, who devotes his energies to establishing respiration. The operator should then peel off the placenta and membranes and deliver them. If the placenta and lining membranes of the uterus are found to be healthy, the uterus may be immediately closed by two rows of sutures, one through the muscular substance at intervals of not more than half an inch, the other row of sutures passing through the peritoneum. In the first, the needle should not pass through the lining membrane of the uterus if possible, but should enter the muscular substance, emerging just above the decidua. For the second, or peritoneal suture, a continuous suture of catgut may be employed, if desired. When the uterus has been properly sutured, pressure made by the hand of the chief assistant or by the rubber ligature should be relaxed. If an atonic condition of the uterine muscle is present, ergot or ergotine may be given by hypodermic injection. Should this prove ineffectual, the uterus may be tamponed through the vagina with iodoform gauze. If amniotic fluid has escaped into the abdominal cavity, free irrigation with boiled water, at a temperature of 100, should be employed. The abdomen is then closed in the usual manner, a

firm antiseptic dressing placed over the incision, and the patient treated in the manner usual after an abdominal section.

The placenta will often be found directly in the line of the incision. When this occurs, the operator cannot avoid incising the placenta and causing free hæmorrhage. He should not, however, hesitate to incise the placenta, rapidly extract the child and separate and deliver the placenta, when the uterus will contract and hæmorrhage cease. Should the case proceed favorably, the patient will have the usual phenomena of the lying-in period. The secretion of milk will be normally established, the involution of the uterus will proceed with very little deviation from its usual course, and no difference should be observed in the general phenomena of the patient's recovery. In two weeks the stitches may be removed from the abdominal incision, and in a month the patient may go about, wearing an abdominal bandage. The lochia are usually red in these cases, and less abundant than after normal labor. The child presents upon examination a notable absence of the configuration of the head usually seen after labor It is different, however, in no other way from the child born naturally.

A number of cases are on record where the Cæsarean operation has been performed twice, occasionally three times, upon the same patient. When the uterus is examined in such instances, no traces can be found of the former incision. If catgut be used it will have been absorbed. Silk is sometimes absorbed and sometimes encysted; silver wire of course remains, but so far as any difference in the uterine tissue is concerned, the union is commonly perfect.

The prognosis for the mother and child in Cæsarean section, when performed as we have indicated, gives nine chances out of ten for recovery to both.

Amputation of the Pregnant Uterus.—When the body of the uterus is the site of a pathological process so that its tissues when incised will not heal kindly, it is best to amputate the uterus at the cervix. Thus, in cases of fibroids, where the incision would pass through a fibroid in performing Cæsarean section, necrosis and septic absorption would result if the usual Cæsarean operation were employed. In cases where the pelvis is

so small that Embryotomy cannot be performed without great danger to the mother, if the fœtus be dead, and especially if septic infection has already begun, the uterus should be amputated. The operation is made with the precautions which have already been described as regards antisepsis. An incision is made over the uterus, and the latter is tipped forward and out of the abdominal cavity. It may then be encircled by the elastic ligature, and steel needles resembling knitting-needles be thrust through the ligature and cervix to keep the former from slipping when the uterus is amputated. The uterus should then be incised, and the child and its appendages removed. Instead of closing the womb by suture, as in the Cæsarean operation, the operator then amputates the uterus just above the elastic ligature. The peritoneal covering of the uterus is then stitched over the stump, the stump is brought up to the lower end of the abdominal incision, the peritoneum is closed down to and around the stump, leaving the cut surface above the line of peritoneal suture. The abdominal incision is then closed from above downward, the stump of the uterus remaining at the lower end of the abdominal incision. If oozing from the stump persists it may be powdered with iodoform and plaster of Paris. If oozing be not present, iodoform should be thoroughly sprinkled upon it, and an antiseptic dressing be placed over it. The theory of the operation is that the stump of the uterus will atrophy, contract and heal by granulation at the lower edge of the abdominal incision. This process is slower than union in the Cæsarean section, and destroys any future possibility for reproduction on the part of the patient. Various other methods for controlling the hæmorrhage and ligating the stump have been employed. The stump has also been ligated, its peritoneal covering drawn over it, and it has been dropped into the abdominal cavity, but the method described has furnished the best results, and is most practicable in the greatest number of cases. The chief dangers following amputation of the uterus are hæmorrhage and septic absorption. Of these, the latter can almost invariably be avoided by proper antisepsis; the former is occasionally beyond control.

CHAPTER XXIX.

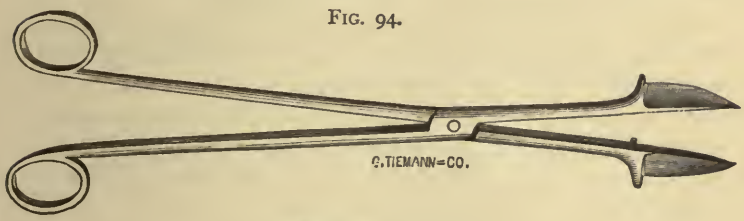
THE SURGICAL TREATMENT OF COMPLICATED LABOR.

EMBRYOTOMY.—When the fœtus is so much larger than the birth-canal of the mother that it cannot be delivered without sacrificing its own life and endangering that of the mother, one of two procedures is inevitable, either to remove the fœtus by the Cæsarean section, or amputation of the pregnant uterus, or to deliver the fœtus by lessening its size. The latter sacrifices the life of the fœtus, if it be not already dead through pressure of the uterus in efforts made to deliver the child. When the fœtus has already perished, the duty of the obstetrician is to deliver it through the natural channels, having previously lessened its diameters. As any procedure which makes the fœtus smaller accomplishes this by cutting the child, such a procedure is termed Embryotomy. Thus, Embryotomy embraces piercing the head, spinal column, thorax or abdomen, allowing the body of the child to partially collapse, thus reducing its size. Embryotomy would also include amputation of fœtal members in cases where a fœtus becomes impacted in a transverse position. The portion of the fœtus which is most frequently pierced to lessen its size is the fœtal head, and a separate name has been given to the operation of piercing the head and evacuating a portion of its contents, namely, Craniotomy.

As Craniotomy is the most frequent operation for lessening the size of the fœtus, it may be considered first. There are practically two methods for lessening the size of the fœtal head; one consists in piercing the skull with a sharp-edged instrument, allowing the brain and its fluids to escape by the pressure of the uterus upon the head; the other embraces the removal of a portion of the cranial bones, leaving a permanent opening into

the skull through which the brain is evacuated by the injection of fluid. The second operation is done by means of a trephine resembling that used in general surgery, but with a longer handle. The instruments employed for simply piercing the head are based upon the principle of a pair of sharp-pointed scissors having the outer edge of the blades near the tips ground to a cutting edge (Fig. 94). The scissors are introduced and the handles separated, thus causing the outer edges of the blades to enlarge the opening made

FIG. 94.

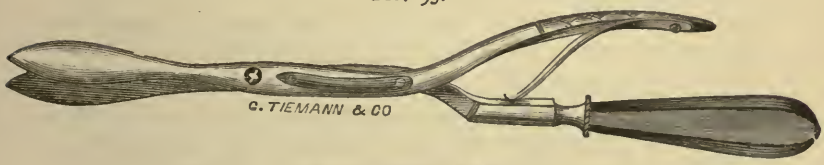


SMELLIE'S SCISSORS.

by the points. The scissors may then be turned at right angles to the direction of insertion, and the blades opened a second time, when a cross-shaped incision will result. Other more elaborate perforators are based upon the same principle as the perforating scissors (Fig. 95).

An indication for Craniotomy exists in a case where the fœtus

FIG. 95.



BLOT'S PERFORATOR.

is too large for the mother's birth-canal, is presenting by the head, and has already died. In a similar case where the fœtus is living, the patient and her friends must choose between a Cæsarean operation and the destruction of a living child by

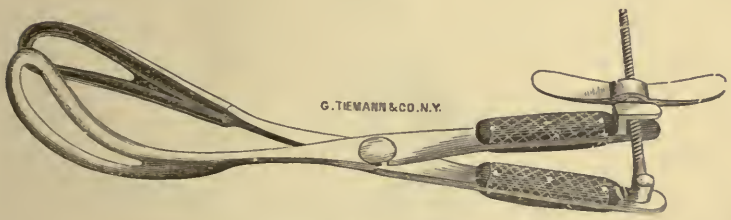
Craniotomy. The opinion is gaining ground among the medical profession that Craniotomy upon the living child is unjustifiable, and this opinion is likely to obtain a still firmer footing as physicians become more familiar with obstetric surgery. It is always well to respect the beliefs of the parents of the child regarding religious observances, as many persons discourage Craniotomy upon theological grounds.

It should be borne in mind that Embryotomy requires antiseptic precautions as complete and as carefully carried out as an abdominal incision. A vaginal douche of bi-chloride, one to five thousand, should be given, the hands and arms of the operator should be disinfected, his instruments cleansed with boiling water and immersed in a five per cent. solution of carbolic acid, or a two per cent. solution of creolin. The patient should then be anæsthetized, placed across a bed or upon a table, and the operator should ascertain the exact position of the head by a thorough examination.

If it is decided to pierce the skull without making a permanent opening, the fingers of one hand should be introduced as a guide, and with the other the point of the perforator should be firmly but gently forced through the fœtal skull. It is well not to enter the head in a line of a suture, but to make an incision through bony tissue. The blades of the perforator should then be separated, the instrument turned at a right angle, and the blades again opened as has been described. The case then should be left to the expulsive efforts of the mother, the expectation being that pressure of the uterus will force out the brain and its contents, and then collapse the head. Should the mother's expulsive forces fail, the forceps may sometimes be used to advantage in completing delivery. If the head be well ossified, especially at the base of the skull, the simple perforation may be followed by the use of an instrument, designed to crush in the head by strong pressure, known as a cephalotribe (Fig. 96). This is nothing more than a strong pair of forceps with suitable apparatus for forcibly bringing the blades in apposition. A better procedure, however, than incising the skull is removing a portion of bone by the trephine.

Two sorts of obstetric trephines are in use, the straight and the curved. Of these the straight trephine is the better because of its simple construction and the ease with which it can be taken

FIG. 96.



LUSK'S CEPHALOTRIBE.

apart and disinfected. By removing the screw button at the end of the trephine, the instrument can be separated into its three portions, each of which is readily cleansed (Fig. 97). In addition

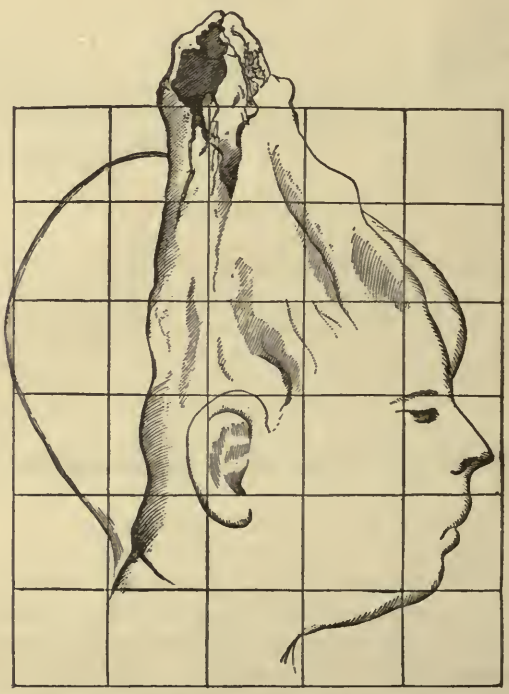
FIG. 97.

MARTIN'S STRAIGHT TREPHINE.

to the trephine, there is needed to evacuate the brain a tube of metal or hard rubber sufficiently strong to be passed freely around the interior of the skull, thus breaking up the brain and its membranes. To this tube should be attached a piece of rubber tubing through which an antiseptic solution may be injected with considerable force by a strong piston-syringe. After the head has been opened and the brain evacuated, there is required for the extraction of the head some instrument one of whose blades shall pass within the opening made by the trephine while the other, applied upon the external surface of the skull, fits into the first by a firm screw upon the handles, thus securing a sure grasp upon the head. This instrument has a pelvic curve like

that of the forceps, and traction is made by it in the axis of the pelvis as in axis-traction-forceps. As the head descends, pressure of the walls of the pelvis collapses the head, and it emerges drawn out in a shape somewhat resembling a sugar-loaf (Fig. 98). The

FIG. 98.



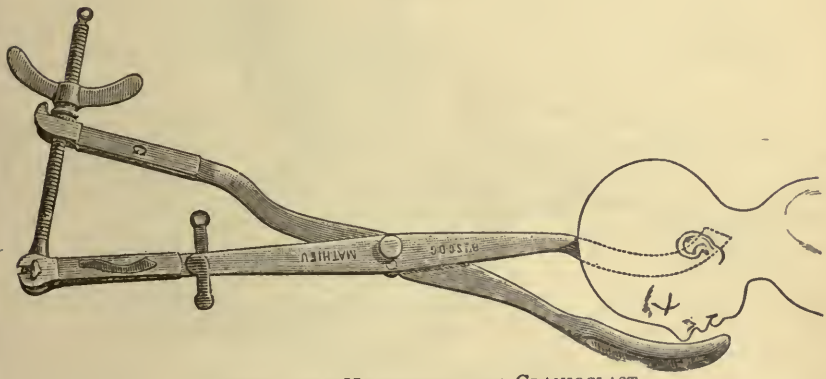
FŒTAL HEAD TREPHINED AND DELIVERED BY CRANIOCLAST.

procedure of extracting the head and collapsing it in this manner is known as Cranio-Clasis, and an instrument designed for this purpose is called a Cranioclast (Fig. 99). The instrument will be better understood by reference to (Fig. 100) which represents the Cranioclast devised by Carl Braun of Vienna.

To contrast the two methods of lessening the size of the head

we may repeat that the skull may be entered by an incision through the bone with a perforator. A pair of strong compressing forceps, with a compressing screw at the extremity of the handles, may then be employed to crush the head and extract it. This is known

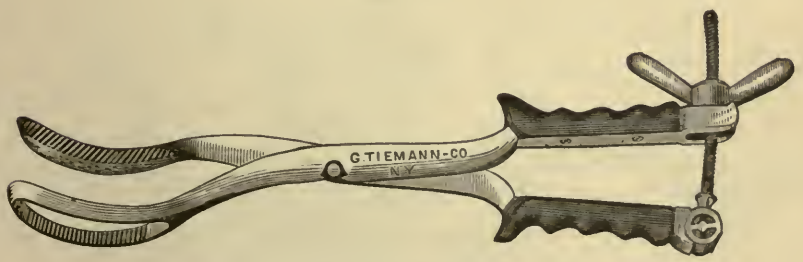
FIG. 99.



GRASPING THE HEAD WITH THE CRANIOCLAST.

as Cephalo-Tripsy, and the compressing forceps is named a Cephalotribe.

FIG. 100.

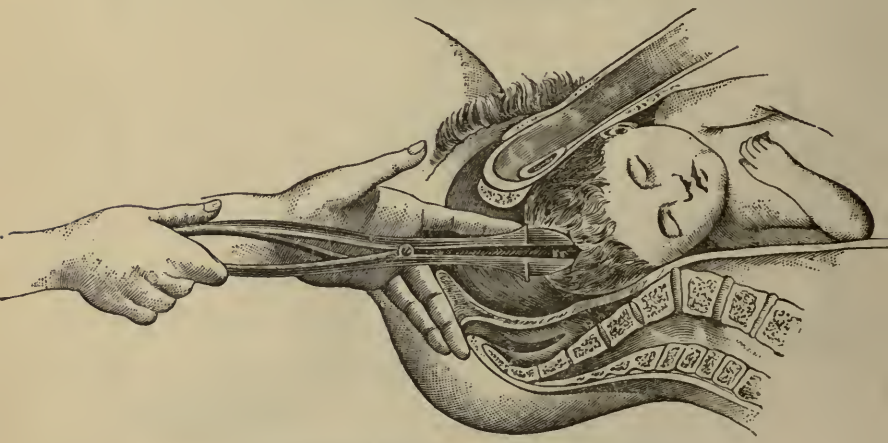


BRAUN'S CRANIOCLAST.

On the other hand, the skull may be trephined and the brain evacuated, and an instrument employed to make traction, one blade of which is inserted through the trephine opening, the

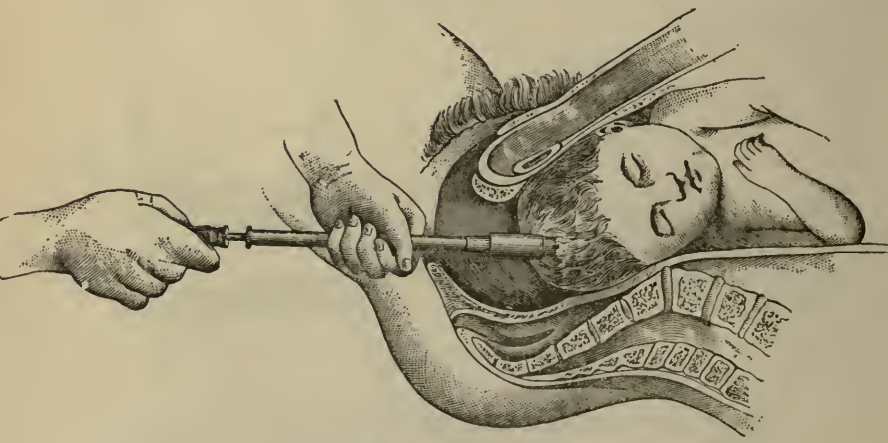
other grasping the head externally, while compression is made by a strong compressing screw. Traction in the axis of the

FIG. 101.



CRANIOTOMY WITH THE SIMPLE PERFORATOR.

FIG. 102.



CRANIOTOMY WITH THE TREPHINE.

pelvis results in the collapse of the head through pressure of the pelvic walls. This is Cranio-Clasis, and the instrument is a Cranioclast.

In cases where twins have become impacted in the uterus, and one or both have perished before assistance arrives, it may be necessary to decapitate the child already partially born, to relieve the mother. In cases of transverse presentation, where the uterus is in a condition of rigid contraction known as uterine tetanus, it may not be safe to attempt to make version because of the danger of uterine rupture. There remains then nothing to do but to decapitate the fœtus and remove the body and head separately.

In transverse positions, amputation of the head may be performed by passing a heavy cord about the neck and, by a sawing motion, cutting slowly through the tissues (Fig. 103). When the child's spinal column is reached, if the cord be guided to the intervertebral cartilage, decapitation may be accomplished without especial difficulty. Should the cartilage not be readily found, a cutting instrument may then be employed to finish the decapitation. A very convenient and safe instrument for this procedure is the hook devised by Carl Braun (Fig. 104). This hook is passed over the child's neck, drawn strongly downward, and a rotary movement from side to side kept up until finally the tissues are completely severed. It is best to employ, if possible, some instrument or device having no sharp cutting edge, as the danger of wounding the soft tissues of the mother is great. Braun's hook is carefully polished, and presents no edge which should injure the maternal tissues (Fig. 105). In cases of impacted fœtus where the body of the child is already born, decapitation may be accomplished by the use of a pair of ordinary strong scissors and a piece of rubber tubing. The tubing should be passed about the neck and tied, forming a circle around the child's neck. Its purpose is to serve as a guard against cutting too high and injuring the tissues of the mother. Guiding the scissors with the left hand, with the right hand the tissues are severed just beneath the constricting tube, and thus decapitation is accomplished.

Ingenious instruments have been devised by which a cutting edge, in the form of an *écraseur* or cutting wire, may be passed about the head, but such instruments are more complicated and less safe than the simple devices described.

In cases of hydrocephalus, when the child presents by the

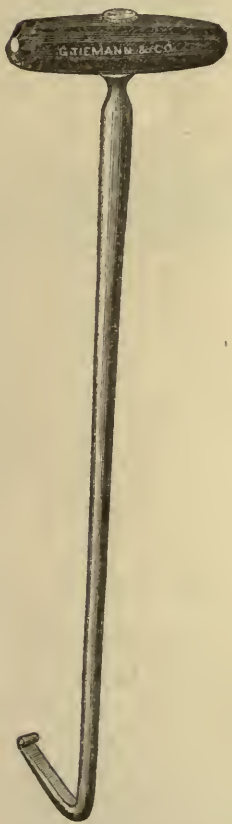
Fig. 103.

Decapitation; Tightening a Cord around the Neck.

breech, the progress of birth will often cease with the efforts to expel the head. It is desirable in such cases to drain the subarachnoid spaces to lessen the size of the head; an opening may be made into the spinal column, the soft tissues having first been incised to permit of easy access to the vertebræ.

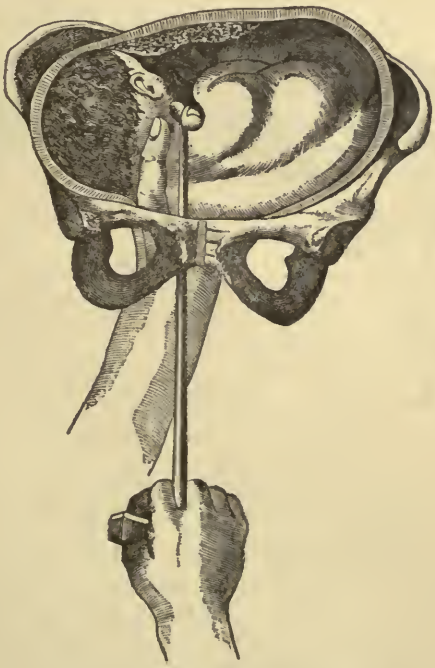
By evisceration is understood that form of embryotomy which opens the abdominal or thoracic cavity of the fœtus, allowing the escape of blood and other fluids contained in these cavities, and

Fig. 104.



Braun's Decapitation Hook.

Fig. 105.



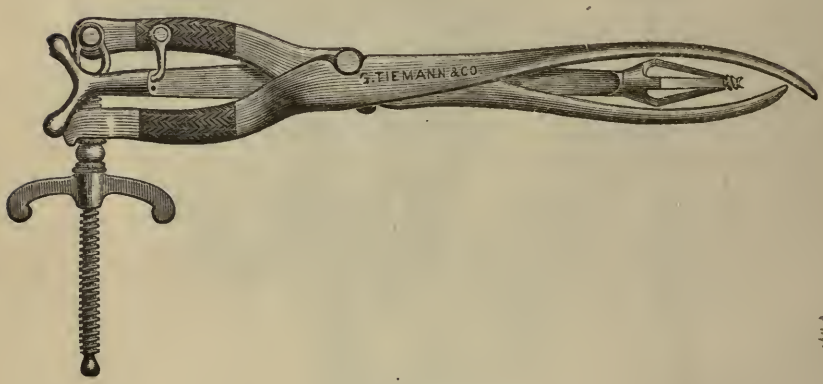
Decapitation with Braun's Hook.

oftentimes the removal of the viscera themselves. This is usually readily accomplished by incising the walls of the cavity. It is

sometimes best to eviscerate the thorax by opening the abdomen below the diaphragm, rupturing the diaphragm, and extracting the lungs and heart from the opening thus made.

Embryotomy requires especial caution as regards antisepsis. It is well not only to cleanse instruments and hands, but also to wash out a cavity opened, by an antiseptic solution. In cases where the fœtus has died it may contain in its body sources of

FIG. 106.



TARNIER'S BASIOTRIBE.

infection, and hence its tissues should be antisepticized at the moment when the body is opened.

Craniotomy upon the after-coming head is sometimes indicated in cases where the head becomes impacted at the moment of delivery in breech presentation (Fig. 106). It is usually most convenient to enter the skull through the *foramen magnum*, the head having been brought as far down as possible by traction upon the trunk. After the evacuation of the skull, delivery will be usually accomplished most easily by the use of the cephalotribe. It may sometimes be necessary to enter the skull through the roof of the fœtal mouth.

MINOR OBSTETRIC SURGERY IN DELAYED LABOR.—In cases where delay in labor occurs through rigidity of the os and cervix,

dilation may be accomplished by stretching, with the fingers or Barnes' rubber bags, or by making multiple shallow incisions in the os and then dilating. Especial precautions regarding antisepsis are required in these cases, for wounded surfaces in the os and cervix become easily infected. By multiple incisions extensive laceration of the cervix may often be prevented.

CHAPTER XXX.

THE PUERPERAL STATE.

The accomplishment of labor marks the beginning of what is known as the lying-in period, or *puerperium*, or the puerperal state. By this is understood the time in which the woman is recovering from the effects of her labor. It will be seen that no limit can be set in all cases for the puerperal period. Thus, the savage woman recovers from labor sufficiently to resume her usual avocations in a few days, while her civilized but weaker sister requires several months to fully recover from parturition. The lying-in period applies especially to the time during which the patient is in bed, but also the time elapsing before the patient engages actively in her former pursuits. The phenomena of the puerperal period are those connected with the process by which the uterus and the entire genital tract are reduced in size from their hypertrophied condition at labor to their normal proportions. Together with this process, called *involution*, the abdominal muscles of the patient, which have been strained and distended during the pregnancy, assume their former consistence and contractile power. The hypertrophies which have existed in the secretory and glandular organs of the patient gradually give place to the usual conditions obtaining in these parts. Together with these changes, which may be styled retrograde or absorptive changes, there occurs the establishment of a new function, namely, lactation, or the secretion of milk.

It is evident that the first set of changes mentioned, namely, *involution*, results in the formation of a large amount of material to be removed from the body. If organs have hypertrophied by the multiplication of cellular elements and the aggregation of tissues, a normal condition of these organs can only be reached

by eliminating the excess of material. Thus, the uterine muscle and the enlarged and multiplied glands of the lining membrane of the uterus are lessened in size by a process closely resembling that of fatty degeneration. The material produced by this degeneration is, a portion of it, oxygenated in the patient's blood by respiration, while the greater part of it is removed from the body by the different emunctories. The presence in the blood of this fatty material produces an increased amount of bodily heat, resulting oftentimes in a slight and habitual rise of temperature during the week or ten days of the puerperal period. Thus, the average temperature of the healthy lying-in woman is often one hundred degrees instead of ninety-eight and five-tenths. In some cases, the patient seems to take care of this material without disturbance of temperature and with, possibly, a different mode of elimination. Together with the breaking down of hypertrophied tissue there comes a process of multiplication of red blood corpuscles which restores to the blood its losses at labor.

When once the fatigue of labor has been surmounted, a sense of physical comfort and an increase in appetite commonly occur, which persist through the puerperal period. The lacerations in the genital tract heal during this time; deposits of pigment upon the face or other portions of the body are slowly absorbed and destroyed, and oftentimes a gain in weight and an increase in the development of the woman follow parturition. While the breasts have become somewhat hypertrophied by a turgid condition of the mammary glands during pregnancy, yet the formation of breast-milk does not take place until a number of hours, or possibly two or three days after delivery. The milk may then come into the breasts, as it is sometimes said, "with a rush." The breasts become distended, reddened from a general hyperæmia, and frequently the neighboring lymphatics show a temporary engorgement. The over-distended tissues of the perineum and pelvic floor regain their elasticity to a considerable extent. There always remains, however, a certain degree of dilatation—sufficient to make a diagnosis of a previous parturition possible.

A peculiar condition of receptivity to certain infections seems to obtain during the lying-in period. Thus, the exanthematous diseases are more easily contracted by lying-in women than by others. Septic infection from polluted air, or from unclean surroundings, is also readily absorbed. While this may be explained in part by the lacerated surfaces of the genital tract, infection from a contaminated atmosphere is sufficiently common to illustrate the patient's receptive condition. The nervous system, which has been so severely taxed during parturition, shows immediately afterward an unstable state which renders the patient easily disturbed by emotion. Thus any cerebral disturbance results in a considerable derangement of temperature, or, oftentimes, in serious interference with the function of lactation.

The treatment of the puerperal period consists in surrounding the patient with such an environment that her dangers of infection shall be reduced to a minimum, and that the processes of absorption and repair be disturbed as little as possible and furthered in every way. Tranquillity and rest for the nervous system are also of paramount importance. To secure proper protection against infection for the lying-in patient, her room should be clean and not connected with any channel leading to decomposing material. Thus, it is better that there be in her apartment no pipe leading to a cesspool, drain or sewer. Occasionally, heating apparatus may become a source of danger, as illustrated in a hospital where a nurse had carelessly thrown a napkin, stained with the lochial discharge, into an unused furnace; a flue from the furnace opened near the bed of a patient recently confined, who contracted septic infection from air conveyed through the flue from the furnace below. More frequently, however, the immediate environment of the patient may become a source of safety or of danger. Thus, her bed and bedding should be absolutely clean; the effete material removed from her body by the intestines and kidneys should be promptly disposed of, and the lochial discharge should be absorbed in such a manner as to prevent its decomposition. The air which the patient breathes should be pure, fresh, and frequently renewed. Processes of excretion and invo-

lution are best furthered by promoting the action of the excretory organs, and by favoring nutrition in every possible way. Thus, it is an excellent custom to secure a thorough evacuation of the intestines on the second or third day after labor, and the bowels should move at least once in two days through the lying-in period. The action of the kidneys should be encouraged by water freely taken. The skin should be stimulated to perform its function by a daily bath, followed by gentle massage. The nervous system of the patient should be afforded rest by securing absolute freedom from intrusion.

As regards the absorption of the lochia and the prevention of absorption by wounded surfaces of the genital tract, antiseptics are indicated. It has formerly been customary to receive the lochial discharge upon napkins, which were cleansed when soiled, and used again. As our knowledge of antiseptics has increased, this practice has, so far as possible, been superseded by the use of absorptive dressings, which are destroyed when soiled. These dressings have the further use of occluding the genital canal, and preventing the entrance of infectious germs from the outside. Among the many occlusion and absorptive dressings employed may be mentioned sublimated jute enclosed in cheese-cloth soaked in sublimated solution; old, soft linen, antisepticized in the same manner, and made into absorptive pads, and, in the experience of the writer, a pad or napkin made as follows: first, a strip of picked oakum or jute three-fourths of an inch thick, sixteen inches long, five inches wide. On each side of this, cheap cotton batting, sufficient to cover and inclose the oakum. The whole is included in a piece of cheese-cloth, eighteen inches long, twelve or thirteen wide. The edges of the cheese-cloth are brought together and secured loosely by cotton thread. The ends may be closed to advantage in the same manner. This napkin is dipped in bichloride of mercury, one to two thousand, and dried.

On an average, six or eight are required for the first three or four days after confinement, and subsequently four daily. When the material is bought in large quantities at wholesale, and these

napkins are made by hospital nurses, the material itself, exclusive of the labor and the bichloride of mercury used, costs one and one-quarter cents for each napkin. When a small quantity are made—less than a hundred—the napkins cost, also excluding labor and bichloride, about three cents each. When stained through, the pad is removed, rolled up in a bit of old paper, and burned.

The question as to the possibility of a patient infecting herself with puerperal sepsis from the secretions or discharges of her own body has occasioned much discussion. If auto-infection be possible, then the lochial discharge is extremely dangerous to the patient, and should be thoroughly antisepticized. If, on the other hand, the lochial discharge is dangerous only after it has come in contact with the external atmosphere and undergone a partial decomposition, then the lochial discharge does not need to be antisepticized except after it has emerged from the body into the external atmosphere. If an examination of the genital tract of the mother be made after labor to determine presence or absence of septic bacteria in her lochial discharge, it is found that only where the lochia come in contact with the atmosphere do septic germs exist. In the lower portion of the vagina are found the lower orders of bacterial life. The interior of the uterus in a normal case contains no septic germs whatever, and hence requires no disinfection. The routine use, then, of vaginal douches after labor is quite unnecessary, and often harmful, because of the risk of infection which occurs whenever the human body is entered by any instrument or appliance. Practically, then, when a patient has not been infected before labor by syphilis, gonorrhœa, or septic infection, she needs after labor but a single vaginal douche. This should be given of bi-chloride of mercury one to five thousand. After this no douches are needed, but the parts should be bathed with the same solution after the renewal of each pad, and especially after the bladder and rectum are emptied. It is well, in all cases where specific, septic or catarrhal inflammation of the genital tract has occurred before labor, to give the patient a preliminary douche of some

antiseptic when labor begins. Bi-chloride of mercury one to five thousand is often employed. A preparation of green soap and creolin, so combined as to contain from one to two per cent. of creolin, has been used in the Philadelphia Hospital for several years with advantage. The soap is especially efficient in removing retained and partly decomposed secretions.

Especial precautions are necessary whenever occasion arises for catheterizing the patient. The catheter should be kept in a five per cent. solution of carbolic acid, or a one to one thousand solution of bi-chloride of mercury. Before its introduction the attendant should carefully cleanse the orifice of the meatus with a bi-chloride solution one to five thousand. The catheter should then be inserted without coming in contact with the patient's bedding or surrounding portions of her body. After the bladder has been emptied, the parts should again be cleansed in the same way as before the insertion of the catheter. With these precautions it is possible to avoid infection of the bladder, although, without them, such infection and consequent inflammation are very apt to occur.

CHAPTER XXXI.

THE PUERPERAL STATE: LACTATION.

The breasts of the mother also require attention during the lying-in period to prevent the entrance of germs and the development of mammary abscesses. During the latter months of pregnancy the patient should have washed the nipples thoroughly with Castile soap and warm water, and if any cracks or abrasions exist, an ointment of boracic acid, ten grains to the ounce of some suitable fat, should be employed. At the time of labor it is well to prevent congestion and over-distension of the breast, and also to take precautions that some of the lower forms of bacteria, which easily infest the child's mouth, should not form upon the nipple. The breasts may be advantageously supported and compressed by several forms of breast bandages. Thus a broad figure of 8 may be passed around the breasts and over the shoulders. A breast-binder may be used which, in the experience of the writer, has never occasioned inconvenience, and usually proves a considerable comfort. This should be fitted by the nurse at the time when the breasts become distended. A strip of unbleached muslin or Canton flannel should be selected, large enough to encircle the body, lapping over between the breasts, and wide enough to go over the axillary line to the extremity of the sternum. This may then be pinned about the patient, the line of pinning being in the centre of the body between the breasts. Opposite to the nipples two holes should be cut the size of a silver quarter of a dollar, and these apertures should be bound with strong tape, otherwise the weight of the breast will force the gland through the bandage, tearing it asunder. An aperture of this size will ordinarily enable an infant to nurse without removing the bandage, but should it be desired to en-

large the aperture, this may be done to any extent required. Shoulder-straps are then fitted, being fastened anteriorly to the upper edge of the bandage, passing over the shoulder to the upper edge of the bandage upon the other side and behind. By tightening or loosening the shoulder-straps the breasts may be gathered toward the median line, and raised toward the upper portion of the body. In this way the patient will experience a marked degree of comfort, and over-distension and threatened engorgement may be prevented. Infection of the nipple and of the breasts may be guarded against by cleansing the nipple thoroughly after each nursing with a saturated solution of boracic acid, to which a little glycerine has been added. Should cracks or fissures occur, they may be painted, after being cleansed, with compound tincture of benzoin.

It will be found advantageous to take precautions to avoid the growth of bacteria in the mouth of the child. While septic bacteria do not often gain access to the child's mouth, yet some of the lower forms of these germs are very commonly found there, and may infect the mother's nipple. It is well to cleanse the child's mouth, after nursing, with a bit of soft old linen, dipped in a saturated solution of boracic acid, to which a little glycerine has been added. The breasts should be nursed, so far as possible, in alternation. During the day, two hours is a convenient interval for the child to nurse, and during the night, twice between ten in the evening and six in the morning is quite sufficient. If the nurse insists upon the child's feeding regularly through the day, even waking it if necessary, it will be much more likely to sleep at night, and will be well able to do with less frequent nursing. No absolute rule can be laid down regarding the amount which any child should take. The child's appetite, if it be properly taken care of, is usually the best guide. When a child nurses with great greediness, some abnormality in digestion should be suspected, and sought for, if possible. Such children are very apt to regurgitate very frequently after nursing, and are often troubled with indigestion and flatulence. The habit of greedy nursing may sometimes be

corrected if the mother will allow the nipple to rest between two fingers of the hand which is supporting the breast. Pressure upon the nipple in this manner will regulate the flow of milk, and prevent too large an amount from entering the child's stomach at once. On the other hand, a tardy secretion of milk may occasion some anxiety for fear lest the infant suffer. If the usual preliminary flow of colostrum is present, but little uneasiness should be felt, although the discharge from the breast remains thin. If the infant cries from hunger which cannot be appeased, one or two meals of sterilized milk may be given during the twenty-four hours.

It not infrequently happens that some abnormal condition of the mother's milk exists, which causes it to disagree with the infant. A gross inspection of such milk would result in finding it thinner than normal, and bearing the appearances of a fluid deficient in the amount of fat. An accurate idea of the composition of such milk can only be obtained by subjecting it to an examination with a lactometer, and also to microscopic examination. As the physician cannot always have a lactometer at his disposal, he will do well to rely largely upon his microscope. Normal milk, when viewed under the microscope, presents a number of rounded bodies which are the milk globules. They are of fairly uniform size, and are smooth and not granular in appearance. In the first milk or colostrum which forms, there are found numerous young epithelial cells, which are derived from the gland tubules of the breast. As the secretion of milk becomes established, these colostrum corpuscles, as they are often called, disappear, and in their place the field of the microscope is found to contain the rounded, smooth, corpuscular body which forms the essential element in milk. The fully developed milk-globule is a cell composed of an albuminoid outer wall or envelope, containing a small amount of fat. When digestion occurs, the albuminoid envelope is digested and dissolved, and the fat is directly absorbed in the lacteals. If a microscopic examination be made of the stomach of an animal digesting milk, the fat of the milk may be observed in a state of granular degeneration

in the tubules of the stomach and intestines. It is then undergoing the process of absorption. If the physician, upon examining a sample of milk, finds many colostrum corpuscles present, and that the number of milk-globules is deficient; that they are not of a fairly uniform size, and seem not to be present in abundance in the field, he may reasonably infer that the milk is deficient in quality. If, furthermore, he should observe blood-corpuscles, pus-cells and bacteria in the milk, he should at once reject it for use, as being infected with some form of puerperal infection. Should the mother be suffering from tuberculosis of the breast, the tubercle bacilli can be detected in the milk.

Much discussion has been aroused regarding the influence of the mother's diet upon the secretion and quality of her milk. It has been a common practice to interdict such articles of food as are supposed to "sour" the milk. Such, for example, are acids and food cooked or dressed with an acid. Salad and pickles were considered as highly objectionable food for a nursing mother. Further studies on the mother's digestion have shown that whatever agrees with her personally, and whatever is digested well, as a rule produces milk for her child. The food of the nursing mother should be easily digested, abundant in quantity, palatable, and, if possible, enjoyable. Certain articles of food tend to increase materially the flow of milk; such are milk itself, when taken freely by the mother; beets, vegetables containing sugar; chocolate and cocoa are beverages tending to increase the secretion of milk. Beer and porter, in many cases, and water, are also beverages of practical value.

Patients differ greatly in regard to the perfect performance of the function of lactation. Drugs given to promote the secretion and flow of milk are useful only as they are general tonics. There is no specific of practical and continued value in these cases. The care of the breasts during the period when lactation is about to be established is a matter of considerable importance. Not only should the nipple be kept thoroughly cleansed, as has been described, but the settling and accumulation of milk in any portion of the breast should be prevented by gentle friction and

massage over those portions of the gland where the milk-ducts are distended and hardened. More important, however, is the use of the bandage as has been described.

Certain drugs are excreted very rapidly through the mother's milk. Such are potassium iodide, the iodides, chlorides and certain drugs affecting the central nervous system profoundly. It has been supposed that opium, when taken by the mother, passed soon into the milk, and thence to the child. While this is undoubtedly partially true, yet there is reason to believe that it passes less readily into the milk than has been supposed. Quinine, when given to the mother, affects the child through the milk, and many purgative medicines have the same effect.

CHAPTER XXXII.

ARTIFICIAL FEEDING OF INFANTS.

It not infrequently happens that the function of lactation fails; this may arise from deficient vigor on the part of the mother without any one local or specific disease. It also follows the acute infections of whatever sort, of which septic infection is the most familiar example. Malformation of the breasts and occlusion of the ducts of the nipple are also causes. A sudden and severe shock to the nervous system of the mother may produce cessation of lactation. This function may be artificially suspended in cases where the child is still-born, or where it is necessary to separate mother and child immediately after birth. There are, again, certain causes which contra-indicate lactation, although the function may become established; such are, a manifest lack of strength on the part of the mother, even although no well-defined disease be present; thus, a woman may have been observed to fail in health while nursing a child, this failure being more pronounced after each successive pregnancy; a woman suffering from tuberculosis, syphilis, cancer, or any other pronounced infection, should not nurse her infant. A curious exception to this rule is sometimes observed in women suffering from scarlatina; cases are on record where such patients have nursed their infants without injury to the latter. It is sometimes necessary to suspend nursing in the interest of the mother because of its exhausting effect upon her.

In the interest of the child, again, it may be necessary to supplement mother's milk by some artificial food, or to suspend lactation entirely, or to feed the child wholly upon some source of nutrition other than the mother's milk. In the interest of the child when its mother cannot nourish it, a substitute or wet-nurse is most desirable. The selection of a wet-nurse should always

devolve upon the physician, and is to be made in the most careful manner; such a woman should be as nearly as possible of the same age as the mother, and her infant should also correspond in age to the one which she intends to feed. The physician will carefully examine the proposed wet-nurse for any evidence of syphilis, tuberculosis, or septic infection. The condition of her digestive organs must also be ascertained, as well as any taint from alcoholism or other objectionable habit. Women of a placid disposition, good constitution and simple, regular habits, are best fitted for this duty. There can be no objection to examining the milk of such a woman microscopically and chemically, but a convenient practical test is found in the condition of her own child; if that is healthy and well nourished, it is but reasonable to expect that another child fed by her should be in similar condition. The breasts should also be examined to see that they are well formed, and that the nipples are not sore nor likely to become so. A not uncommon mistake in the treatment of wet-nurses is the radical change in their habits and style of living which is brought about by the zealous but unwise anxiety of parents to feed them well; women accustomed to frugal habits of living, active work and long hours of sleep, if confined to a house, fed upon rich and indigestible food, and disturbed at night to nurse too frequently a fretful child, cannot remain long in good health, nor will their milk afford proper nourishment for an infant. Care should also be taken that the wet-nurse be subjected to as few mental and nervous disturbances as possible. Since a better knowledge of infant feeding is beginning to prevail, the employment of wet-nurses is not so general as formerly. Physicians appreciate that it is no inconsiderable risk to take a stranger from a hospital to serve as wet-nurse, and many prefer to prepare foods in a well-known and accurate manner rather than to trust to nourishment derived from a woman of comparatively unknown antecedents.

The most natural substitute for mother's milk is that of the cow; while it occasionally happens that nothing but goat's milk will agree with the child, yet in the majority of cases cow's milk

may be so modified as to fulfill the indications. It is essential that this milk be produced under circumstances favorable to its purity, and be conveyed to the consumer as promptly as possible, and in as pure a condition as possible. Observation has shown that finely bred cattle are often subject to tubercular disease, and that tubercular infection can be conveyed to an infant through cow's milk; hence the average cow of fair breed is preferred rather than the highly bred animal; it is sometimes observed that the milk of one cow agrees better with an infant than the milk of another cow of the same kind, and living under the same circumstances.

By sterilization of milk we understand such a process as shall destroy noxious bacteria and thus render milk a safe food. Numerous researches have been made in this matter, but experience points at the present time to the following as the best method of preparation: Milk should be allowed to stand for a little time in order that any impurities which will gravitate to the bottom may have an opportunity to settle; there is no objection, further, to skimming the milk lightly, not removing, however, the greater portion of the cream. Milk should be sterilized, if possible, in the bottle from which the child will nurse, and a sufficient number of bottles should be provided so that sterilization may be conveniently performed once in twenty-four hours; the milk should first be rendered slightly alkaline in reaction, by the addition of lime-water in the proportions of half ounce for an eight ounce mixture; it should then be poured into the bottle, a funnel having been used so that the neck of the bottle does not become wet. In each eight ounces for a new-born child the proportions may be as follows: Cream, ounces, 1½; milk, ounces, 1; lime-water, ounces, ½; sugar of milk, 1 teaspoonful; water to make 8 ounces; the bottle should then be corked with cotton-wool or cotton batting, which has been previously baked in the oven until it is brown; the bottle should then be placed in a pan containing about three inches of water and placed upon the fire, and allowed to heat to a temperature of 155 F. for six minutes. If the milk must be kept longer than twenty-four

hours it should be allowed to come to the boiling point for one or two minutes; the bottles should then be removed from the fire and allowed to cool, and kept upon ice or in a cool place until they are required. When it is time for the child to nurse, the bottle should be placed in a basin containing a few inches of water, put upon the fire and warmed to a blood heat, 98° F.; the cotton cork is then removed and a plain black rubber nipple, which has been previously cleansed in a saturated solution of boracic acid, should be placed upon the bottle and the child allowed to nurse. It will be noticed that this formula calls for a very dilute mixture, adapted for a new-born infant; as the child grows older the amount of water in the mixture is decreased, the relative amount of milk and cream remaining the same, while both are increased. In regard to the amount to be given to the child at each feeding, each infant is a law unto himself; the common mistake is in over-feeding, and hence it is better to begin with three ounces every two or three hours during the day, four ounces taken twice during the night. The bottle ought not to be given to the child and left without supervision to nurse, but its nursing should be watched, and then an intelligent idea of its appetite and needs can be obtained. The child should not be allowed to lie with the bottle beside it, the nipple in its mouth; it should feed until it is done, and then the bottle should be taken away.

Digestive ferments are often employed to advantage with infants. Milk may be peptonized, then sterilized, as has been described, or pepsin and pancreatin may be given just before feeding; cod liver oil is a most useful aid in promoting infant's nutrition, and olive oil will be often taken with avidity and benefit.

It is quite evident that precautions taken to secure cleanliness in dairies are more important than any method of preparing milk subsequently; hence the milch cows should be kept perfectly clean, the hide curried as carefully as that of a horse, the floor of the stable kept as clean as possible, and before milking care taken that the udder and teats of the animal and

the hands of the milker should also be clean. It is sometimes well to milk directly into glass jars which have been previously scalded, and which may be sealed hermetically until received by the consumer; before shipment milk should be kept in a clean, cool place, especially free from the presence of rotting vegetable or animal matter, as it has been shown that poisonous elements may be developed in milk in unfavorable surroundings. It will sometimes be observed that obstinate constipation in infants follows the use of sterilized, scalded or boiled milk; this results from a change in the albuminoid bodies in the milk, and can usually be counteracted by diluting the milk with oatmeal water, instead of the water otherwise employed; while if diarrhœa is present with acute dyspepsia, barley-water may be substituted for oatmeal-water; it is well to avoid the use of cane sugar, as fermentation happens more readily in mixtures containing cane than in those sweetened with milk sugar; in using milk sugar care should be taken that it is of the best quality, as it sometimes, when impure, causes indigestion. When a sudden attack of acute enteritis comes on, there is no question of the wisdom of stopping milk at once; the child can be well supported by whiskey and water, or brandy and water, and by the white of a raw egg mixed with water and slightly sweetened; by carefully made chicken or mutton broths, or by arrow root or barley gruels. As infancy advances, it will be found advantageous to combine with cow's milk some of the prepared foods offered in market; the essential constituents of these foods is usually diastase or starch, or some albuminoid derived from grain. With healthy children in the country, bread and milk, mashed potatoes carefully prepared, broths, soups and soft-boiled eggs usually furnish a proper transition from a diet of milk to the mixed diet of childhood.

CHAPTER XXXIII.

ABNORMAL INSERTION OF THE PLACENTA, PLACENTA PRÆVIA.

The usual location of the placenta is upon the anterior or posterior uterine wall, above the level of the lower uterine segment; in multiparæ, especially those who have suffered from endometritis, atrophy of the villous tissue in the placental decidua, and placental development in the decidua reflexa, result in failure of the placenta to adhere to its customary location. In the upper two-thirds of the uterus the distended and relaxed condition commonly found in multiparæ also favors the location of the placenta in the lower uterine segment or cervix.

Placenta Prævia may be of four varieties: central (placenta prævia centralis), partial (placenta prævia partialis), marginal (placenta prævia marginalis), lateral (placenta prævia lateralis). The first and most dangerous form is that in which the placenta is directly over the mouth of the uterus, between the child and the external world; a diagnosis of this condition is made by the hæmorrhage which is inevitable so soon as dilatation of the os begins. Upon examination, instead of finding the membranes, the examiner comes upon a fleshy mass which is easily distinguished as the placenta; bleeding in these cases is severe, often fatal. It is impossible for the physician to find any portion of the mouth of the womb not filled up by the placenta.

In partial placenta prævia, when a portion of the mouth of the womb is covered by the placenta, there can be distinguished at one side a vacant space where the membranes may be felt.

In marginal placenta prævia, the mouth of the womb is entirely free from the placenta, but by feeling around the margin of the os uteri the finger detects the placenta upon one side, just at the edge of the lumen of the os.

Position of Placenta over os uteri, from body of a woman who died of Uterine Hæmorrhage in the ninth month of pregnancy. Placenta prævia centralis. (Martin.)

In lateral placenta prævia the placenta is attached to the lower uterine segment above the os, and often cannot be found by examination. Its situation must be inferred from the hæmorrhage which occurs when dilatation advances, and the lower uterine segment is distended.

In general terms it may be stated that placenta prævia is that location of the placenta from which it is detached from the uterus during the stage of dilatation. The important symptom of placenta prævia is hæmorrhage occurring suddenly without recognized cause, often following the assumption of the erect posture; it is usually not difficult to confirm a diagnosis by examination.

The dangers of placenta prævia to the mother arise from hæmorrhage and shock, and collapse following, and also from septic infection; the dangers to the child are caused by asphyxia following the premature detachment of the placenta and the cutting off of the supply of maternal blood.

The treatment of placenta prævia consists, in the interest of the mother, in preventing hæmorrhage and septic infection, in the interest of the child, in securing delivery as promptly as possible. Hæmorrhage can usually be controlled until dilatation is sufficiently advanced to secure delivery by the use of the antiseptic tampon. Iodoform gauze is the best material for this purpose, and may be cut into strips three inches wide and three or four feet long; such a tampon should be used in cases where the hæmorrhage is not severe and sudden, and where dilatation is so little advanced that combined version or internal version cannot be employed. The end of the strip of gauze should be inserted within the os and cervix against the placenta, and the parts should be thoroughly distended by the tampon. The vagina should also be moderately distended and uterine contraction stimulated if necessary by gentle friction or administration of small doses of ergot. When, however, central placenta prævia exists, the physician should be prepared, as soon as he can introduce several fingers or his hand into the uterus, to force his hand through the placenta; seize a foot and bring down the breech of the child to act as a tampon (Fig. 107).

In partial, marginal and lateral placenta prævia, if the head presents, and uterine contraction is good, it is often sufficient to rupture the membranes, when the head will compress the placenta between it and the side of the pelvis, thereby stopping hæmorrhage; in cases where dilatation proceeds slowly, a Barnes'

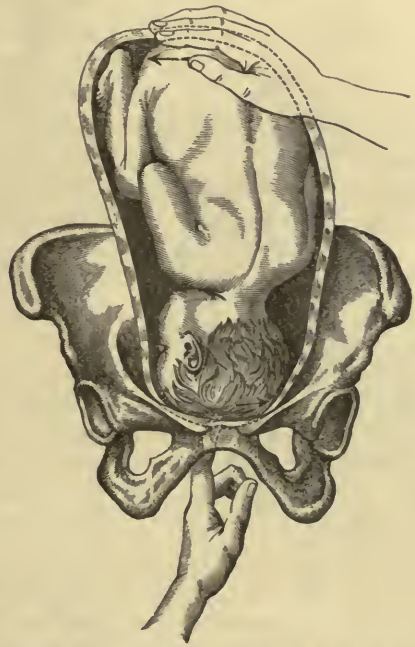
FIG. 107.

PLACENTA PRÆVIA CENTRALIS, INTRODUCING THE HAND TO BRING DOWN THE FEET.

dilator can be used to secure delivery; hæmorrhage can also be checked by bringing down the fœtus by combined version to act as a tampon; for this purpose it is well to place the patient across a bed, and, under partial anæsthesia, with careful antiseptic precautions, to introduce two or three fingers of the hand

which is opposite the feet of the child, pressing the head and shoulders up, while the other hand pushes the breech down by external pressure; an anæsthetic is of the greatest service in securing sufficient relaxation of the uterus and abdominal muscles to permit of this manipulation; a foot is then seized and the

FIG. 108.



COMBINED VERSION, PUSHING UP THE HEAD.

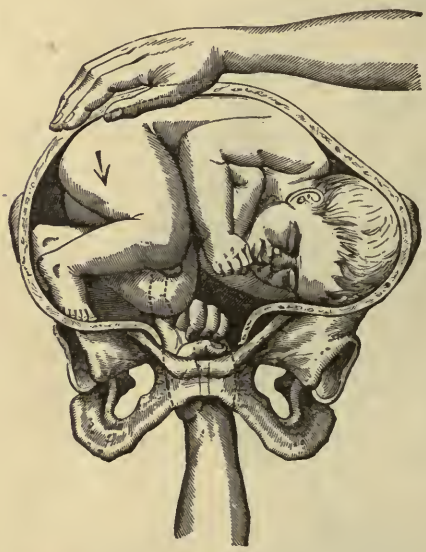
breech drawn down acting as a tampon. In the less dangerous forms of placenta prævia, when the head is presenting and dilatation is almost complete, it is often possible to rupture the membranes and apply forceps in the interests of both mother and child (Figs. 108 and 109).

After delivery in cases of placenta prævia, the uterus should be thoroughly explored to be sure that no fragments of placenta

remain. A hot intra uterine douche of half a gallon of solution of carbolic acid, 2 per cent., thymol 1 to 1000, or creolin ½ per cent., should be given, followed by the introduction into the uterus of a suppository containing 60 grains of iodoform.

The profound anæmia which accompanies placenta prævia requires active and persistent stimulation. Hypodermic injections of ether, digitalis, strophanthus, strychnia and whiskey or brandy are familiar agents of proven value; if the patient is especially nervous and restless, morphine and atropine will often be of value; rectal injections of whiskey and milk, two ounces of each, will be found very useful; in extreme cases some method of transfusion is often of great value. Transfusion is of two kinds: One in which fluids are brought into the circulation from without; the other method is that by which the blood of the patient is retained so far as possible in the circulation of the brain and spinal cord; in the first, while defibrinated blood has been found of great value, the difficulty of procuring it and the time and apparatus required render it inconvenient. A dilute solution of salines containing six-tenths of one per cent. of sodium salts forms a useful and easily procured fluid for transfusion; sodium chloride and sodium bicarbonate are the best substances available for this fluid; if possible, water which has been

FIG. 109.



COMBINED VERSION, BRINGING DOWN THE LEGS.

boiled and filtered should be employed, or distilled water. In the absence of any means for making an accurately measured fluid, it is sufficient to add to water two parts of salt and one of sodium bicarbonate, until the water tastes slightly saline; it should then be heated to a temperature of 100° F., and introduced into the body of the patient through a thoroughly cleaned tube and needle; this is best accomplished by gravity. A rubber tube being attached to the needle and terminating in a small funnel, the needle should be introduced for a quarter or half inch obliquely in the connective tissue above the clavicles, in the abdominal wall or in the axillary spaces.

As much fluid as will be taken up by the tissues may be introduced, the funnel being constantly full to prevent the entrance of air; several ounces of fluid can usually be inserted at each puncture, the tissue around the seat of puncture being rubbed gently to further the passage of the fluid into the connective tissue spaces.

Auto-transfusion consists in bandaging the patient's limbs from the lower extremities towards the trunk and in raising her feet sufficiently high to favor the retention of blood in the brain and spinal cord. She may keep on these bandages and in this position for a number of hours, until sufficient stimulants and fluid can be given to maintain the action of the heart, when the circulation is allowed to go on at its usual rate in its periphery; where respiratory failure threatens, inhalation of oxygen has proven of decided benefit.

It is of the greatest importance that not only should the mother be skillfully treated to prevent hæmorrhage, with its results, but that the most careful antiseptic precautions should be taken during her labor; special attention should be given to cleanliness in her bedding, and as regards the hands and instruments of those who care for her.

CHAPTER XXXIV.

EXTRA-UTERINE OR ECTOPIC PREGNANCY.

WHILE the usual location of the ovum is within the uterine cavity, yet in probably as many as one case in one hundred it lodges and develops outside the cavity of the uterus. The cause of this unusual location of the ovum is some disease of the oviduct which prevents the passage of the ovum from the ovary to its usual location in the uterus; it is often the case that women who have borne children are more liable to this accident than those who have not.

Symptoms of extra-uterine pregnancy are usually those of normal intra-uterine pregnancy; the uterus becomes slightly enlarged, a deciduous membrane forms within its cavity, there is often a cessation of menstruation, and the usual subjective symptoms of early pregnancy are present. The most usual location of the ovum outside the uterus is in one of the oviducts; it occasionally lodges in that portion of the uterine wall where the oviduct passes into the uterus, and rarely it remains at the outer surface of the ovary itself; it is asserted by some and denied by others that the ovum occasionally lodges in the abdominal cavity. So long as the ovum does not become too large for the oviduct, its presence may give rise to no condition which can be detected by examination; the patient presents symptoms of early pregnancy, and, if kept under close observation, the physician may notice that the uterus does not enlarge progressively as would be the case in normal pregnancy (Fig. 110).

In tubal pregnancy, however, the ovum soon becomes too large for the oviduct, and although the latter is capable of considerable distension and its muscular tissue may hypertrophy to a very great extent, yet, at about the third or fourth month, the ovum bursts the

oviduct, and either remains adherent to the ruptured tube or else escapes between the folds of the broad ligament or into the abdominal cavity; the symptoms of such rupture are pain, sudden, sharp, severe in character and the discharge of deciduous membrane and blood from the uterus; before rupture, at about the third or fourth month, a tumor as large as a small orange may possibly be felt at one side of the uterus; after rupture, this may be unrecognizable or still be indistinctly outlined; after rupture the ovum may drop into such a position between the folds of the broad ligament that the clot of blood which is poured from its sac at the moment of rupture is limited by the surrounding serous membrane, forming an hæmatocele; should the ovum rupture into the abdominal cavity, hæmorrhage may persist and become fatal.

FIG. 110.

TUBAL PREGNANCY.

In the former instance the symptoms of shock which accompany rupture gradually grow less and the patient may rally without treatment, except rest in the recumbent position; after rupture into the abdominal cavity shock persists, a condition of coma ensues, and the patient perishes from the effects of hæmorrhage. Where the ovum escapes into the abdominal cavity, it occasionally becomes encysted, the placenta is developed from the mesentery or from the intestines, and pregnancy continues to full term or even longer; a living child has been delivered after such pregnancy; when pregnancy persists and the fœtus perishes, it usually becomes mummified

or macerated, and occasionally calcareous deposits form which turn it gradually into a stone child or lithopædion; in this condition it may be retained in the abdomen of the mother indefinitely.

Interstitial pregnancy usually ends by rupture of the tube just where it enters the uterine wall or by the escape of the ovum into the cavity of the uterus.

Ovarian pregnancy ends in rupture, the ovum escaping into the abdominal cavity or becoming encysted, possibly developing. It occasionally happens that the uterus retains to some degree its fœtal form and development, and this may render possible the lodgment and growth of the ovum in one of the horns of the uterus; in such cases the ovum may develop for a few months, but sooner or later rupture will occur, with the usual symptoms before narrated; in exceptional cases an ovum develops to a period of viability in this manner. Cases are reported of an extra-uterine pregnancy followed by an intra uterine pregnancy, the ovum in the first case dying and becoming encysted, and its removal by operation resulting in abortion of the second intra-uterine ovum. In cases where rupture of the fœtal sac occurs and death of the extra-uterine fœtus, nature often regards the fœtus as a foreign body and seeks to remove it by ulceration into the bladder and vagina or rectum; such a process has even been observed to open the abdominal wall near the umbilicus.

The diagnosis of extra-uterine or ectopic pregnancy is uncertain before rupture of the fœtal sac; it is rarely positive and clear. Hence those methods of treatment are most reliable which confirm beyond doubt the diagnosis of the physician, for it is only by careful analysis of the symptoms of each case, combined with a knowledge of the pathology of such cases, that the physician can hope to make a correct diagnosis. When the presence of this condition is suspected, and good reasons exist for the suspicion, the most natural theory of treatment is that which regards the extra uterine ovum as a foreign body to be treated as other foreign bodies, by removal; efforts have been made to kill the ovum by the application of electricity, the aspiration of fluid from the fœtal sac, or an injection into the ovum of morphia;

the first of these expedients has in some cases been successful, the second and third are rarely successful, and none of these procedures should be the choice of the physician. When the patient will not allow the physician to perform or have performed laparotomy, he is justified in giving other methods of treatment a trial, but they are not the best possible expedients. The most desirable treatment, so soon as rupture occurs, is opening the abdomen, removing the ovum and its appendages with the ruptured oviduct, thereby checking the hæmorrhage promptly. Such is the education of the modern physician that no one should practice obstetrics who is not prepared, should an emergency arise, to operate in this manner; in cities where specialists and hospitals abound, a conscientious physician will often summon a brother surgeon, and procure for his patient the benefit of his greater technical skill; but the obligation of the practitioner, whether he be alone, or whether in easy reach of assistance, remains the same, namely, that he either controls threatening hæmorrhage himself, or procures for his patient some one who can and will do it.

After the removal of the ovum and the tube, and the ligation of bleeding vessels, the abdomen may be advantageously irrigated with hot water; the use of the drainage tube may be determined upon in accordance with surgical principles which are generally taught. In cases where the fœtus is expelled by suppuration, the fœtal sac should be treated like an abscess cavity; drainage should be carefully maintained through the aperture by which the fœtus has been extruded; antiseptic injections should be made into the sac, and the patient supported by suitable food and stimulants. In cases where the fœtus has developed in the abdominal cavity, the obstetrician may delay operation until the fœtus be viable, provided the patient is under observation and easily accessible; when viability has been reached, the abdomen is to be opened, the fœtal sac incised, and the fœtus removed and resuscitated; the cord should be ligated and cut close to the placenta. No effort should be made to separate the placenta and membranes from their attachments if these attachments are formed, and such effort

causes free hæmorrhage; the membranes should be sutured to the edges of the lower portion of the abdominal incision, and a large drainage tube passed into the fœtal sac; the placenta and membranes will be gradually eliminated by a process of conservative necrosis; at the end of a week or ten days the placenta can be cautiously removed, and the cavity left will gradually close by granulation; during this process this cavity should be treated with antiseptic applications.

In cases of interstitial pregnancy operation should consist in the removal of the fœtus, and the amputation of the uterine cornu with sufficient resection of the uterine wall, if necessary, to bring about coaptation.

It must also be observed that extra-uterine pregnancy must be more frequent than has been commonly supposed, and that a considerable number of such cases terminate in spontaneous recovery; such are those in which the ovum dies in the oviduct before rupture; where the ovum and its clot become encysted immediately after rupture and remain inert for an indefinite time; the existence of such a possibility, however, cannot lessen the responsibility of the physician in the study and treatment in these cases.

CHAPTER XXXV.

POST-PARTUM HÆMORRHAGE.

Bleeding from the uterus after delivery is normally prevented by uterine contractions, whereby the muscular fibres of the uterus compress its sinuses. The condition of the mother's blood at the end of pregnancy favors rapid and firm clotting of blood in the uterine sinuses. The small vessels of a healthy endometrium do not readily rupture, and persistent oozing of blood from the endometrium does not occur after labor in a healthy woman.

Arterial bleeding from the uterus follows extensive laceration of the cervix which wounds the circular artery of the uterus. Ordinarily, however, lacerations of the cervix do not extend sufficiently to wound an artery, and only capillary oozing is observed.

Post-partum hæmorrhage may also follow laceration of the vagina and pelvic floor. It is rare to observe such bleeding which does not cease spontaneously; the hot vaginal douche followed by an antiseptic tampon is generally sufficient for these cases; if not, immediate suture is required.

As post-partum hæmorrhage is most frequently uterine hæmorrhage, the obstetrician is especially concerned with those causes which produce the relaxation of the uterine muscle and ensuing bleeding. After labor, in cases where the uterus has been overdistended by more than one fœtus during pregnancy, hæmorrhage may be feared, as an overstretched muscle is often a paretic muscle. In poorly-developed women the uterine muscle is ill-developed in common with the voluntary muscles, and relaxation after labor may occur. When the uterus has been exhausted in complicated labor, as after transverse position followed by version, hæmorrhage must be feared. Infections which profoundly affect the mother's blood, rendering it less coagulable than normally,

favor hæmorrhage. Shock and injury to the nervous system which depress the nervous supply of the uterus cause relaxation of the uterine muscle and hæmorrhage.

Many cases of hæmorrhage are caused by the improper conduct of labor. Rapid delivery, failure to stimulate the uterus to contract by friction after the placenta has been expelled, removing the placenta by pulling on the cord and failure to properly stimulate the nervous system of a weak patient are among the most common errors producing hæmorrhage.

The symptoms of post-partum hæmorrhage are rapid, soft pulse, a large doughy tumor in the abdomen, alarm or prostration on the patient's part, with thirst, sudden failure of vision or sense of suffocation and the discharge of blood from the vagina. These symptoms are mentioned *in the order of their relative importance.* It must be remembered that most alarming hæmorrhage may occur *with no discharge of blood for several minutes.* Hence the wise precept: "Do not leave a woman after labor when the pulse is 100, or above," as there is a liability to hæmorrhage. If the practitioner is intelligent enough to detect a relaxed condition of the uterus *before* blood has escaped through the vagina, he can control hæmorrhage before it becomes dangerous. When the condition of the pulse excites suspicion, the abdomen should be examined at once; the firm tumor formed by the well-contracted uterus will be absent; an ill-defined mass will indicate the location of the enlarged and relaxed womb.

Post-partum hæmorrhage is rare in cases conducted by intelligent physicians. The best methods of conducting labor favor good contraction of the uterus and render the occurrence of hæmorrhage infrequent. When the uterine muscle is not allowed to become over-distended by delay in complicated labors; when delivery in normal labor is not hurried; when time is taken to secure a normal third stage of labor and the placenta is delivered by expression, hæmorrhage rarely occurs.

The treatment of this condition consists in *instantly* examining the abdomen so soon as the pulse occasions suspicion or blood flows from the vagina. Failing to find the well-contracted ute-

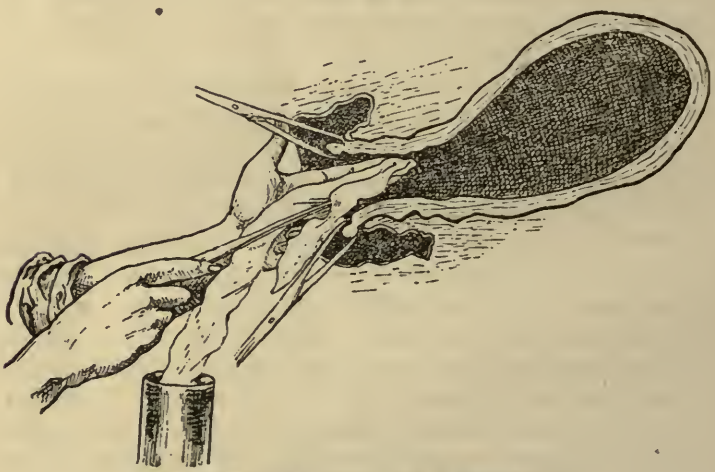
rus, the hand is placed broadly on the abdomen, and rapid friction, with a kneading movement, is made. The uterus will respond better to rapid light massage than to more violent and slower manipulation. As soon as the uterus can be defined by the hand, it should be grasped. The fingers are best placed behind the fundus, deeply in the middle line of the abdomen; the thumb holds the uterus in the middle of its anterior surface in front; the back of the hand is above, over the fundus. Pressure should be made in the axis of the pelvis, downwards and backwards, not laterally. In lateral pressure an enlarged ovary may be compressed between the hand and the uterus, and sudden, excruciating pain, with symptoms of shock, have been seen to follow such compression.

If a nurse is available, she may give the patient a hot vaginal injection of a gallon of water that has boiled, at a temperature of 100° F. to 110° F., while the physician manipulates the uterus. Water as hot as the nurse can taste may be taken in the lack of more accurate measurement. A hypodermic syringe full of ergot (fluid extract) may be injected deeply into the subcutaneous tissue at the sides of the abdomen; ergotine may be employed in doses of 20 minims in the same manner. If the uterus contracts under this treatment, the hand should rest upon the fundus, without massage, until the pulse and general condition of the patient warrant the belief that danger is over. Several large towels may then be taken and folded in suitable pads. One is to be placed across the abdomen, behind the fundus; one on each side of the uterus; a broad, firm binder should then be pinned firmly around the patient, from above downward, reaching from the umbilicus to the trochanters. Ergot or quinine may then be given by the mouth, and the patient put perfectly at rest. When the physician or nurse is intelligent in observing the pulse, it is safe to bandage the uterus. When no such intelligent care is available, it is better not to apply pads and bandage, but trust to the hand upon the uterus, with constant watchfulness.

The majority of cases of post-partum uterine hæmorrhage yield to this treatment if recognized promptly. When the physician

does not reach his patient until she is already reduced by hæmorrhage, he must add active stimulation to the treatment described. The patient's head should be lowered, and the foot of her bed raised three feet and more higher than the head. Auto-transfusion and the injection of saline solution into connective tissue spaces may be done to advantage. Rectal injections of whiskey ℥ 2 and hot milk ℥ 2, may be given. If massage, ergot and hot vaginal douches fail to secure uterine contraction, the uterus should be douched with hot water, a vaginal douche having been first given.

FIG. 111.



TAMPONING THE UTERUS FOR HÆMORRHAGE.

If the uterus still refuses to contract, a strip of iodoform gauze four feet long and three inches wide should be grasped by uterine dressing forceps. While one or two fingers of one hand guide the forceps to the os, the other hand, grasping the forceps, should carry the end of the gauze to the fundus of the uterus (Fig. 111). The mere presence of a strip is usually enough to excite contraction, but if great relaxation is present, the uterus may be moderately tamponed, the remainder of the strip being used as a vaginal tampon. This strip of tampon may be left twenty-four

hours if antiseptic precautions have been carefully observed. It should then be removed, the vagina and uterus douched with creolin, 2 per cent., carbolic acid, 2 per cent., or thymol 1 to 1000, and if needed, the tamponing may be repeated. In the absence of iodoform gauze, bichloride gauze, or a roller bandage or strips of muslin dipped in bichloride solution, 1 to 10,000, or whiskey and water, may be used. In hospital practice a Faradic battery should be part of the equipment of each lying-in ward, as the Faradic current, one pole over the uterus, the other over the spinal cord, is of value in these cases.

Vinegar or lemon-juice squeezed into the uterus, or a lump of ice placed in the uterus are domestic remedies which are useful in the lack of better.

Where nervous prostration and excitement are present, opium and alcohol are of advantage. Morphia gr. $\frac{1}{8}$ and atropia gr. $\frac{1}{200}$ hypodermically, with frequent injections of ether or brandy, are valuable agents.

Where post-partum hæmorrhage is caused by rupture or laceration of the uterus, or laceration of the vagina, surgical treatment is requisite. The extirpation of the uterus by abdominal incision; immediate suture of a lacerated cervix or vagina are indicated, and under antiseptic precautions may save life.

It occasionally happens that bleeding from a diseased endometrium, or bit of retained placenta, persists after labor or occurs in the puerperal state. Hot antiseptic intra-uterine douches are first indicated; in the event of their failure, the uterus should be thoroughly scraped with the blunt douche-curette and tamponed with antiseptic gauze. Intra-uterine suppositories should be used for several days after the removal of such tampons.

In post-partum hæmorrhage in patients whose blood is profoundly impaired, inhalation of oxygen is useful; in malarial cases, the hypodermic injection of 30 grains of bisulphate of quinine in freshly-made camphor water has been found of value.

During convalescence from post-partum hæmorrhage, inhalation of oxygen and the administration of arsenic, with or without iron, give excellent results.

CHAPTER XXXVI.

THE ACCIDENTS OF LABOR ENDANGERING THE MOTHER.

The mother's life may be suddenly threatened during labor by causes which modern knowledge of the physiology and pathology of labor has enabled the obstetrician to foresee and prevent in the majority of cases. One of these accidents which is largely preventable is rupture of the uterus.

When the expulsion of the child is delayed and the uterus continues to contract, the upper expulsive segment becomes firmly contracted in a condition of tetanus; the lower elastic segment is distended more and more by the continued pressure from above and by the settling down of the presenting part. The junction between the two segments is marked by the lower edge of the upper expulsive segment which forms a firm and prominent ring to be plainly felt on palpation. This is the contraction ring of Bandl, and furnishes a symptom of threatened uterine rupture. If the uterine tetanus persists and delivery is not accomplished, the uterus may tear asunder just below the contraction ring, on its anterior or posterior surface (Fig. 112).

Uterine rupture occurs in cases of transverse positions of the fœtus, where labor is neglected and uterine contractions are vigorous. It also occurs in contracted pelvis, where the uterus labors hopelessly to expel the child, finally tearing. This accident is naturally more frequent in multiparæ who have borne many children than in primiparæ; also in multiple labor because the uterus has been over-distended by more than one fœtus. Weak, poorly-developed women are more exposed to this accident if the child be large, and they become exhausted in labor.

Symptoms of threatened rupture of the uterus are the existence of a well marked contraction ring; rise in the patient's pulse rate

FIG. 112.

THREATENED UTERINE RUPTURE.

l. s. Lower uterine segment; *C. R.* Contraction ring: *o. i.* Internal os; *o. e.* External os.

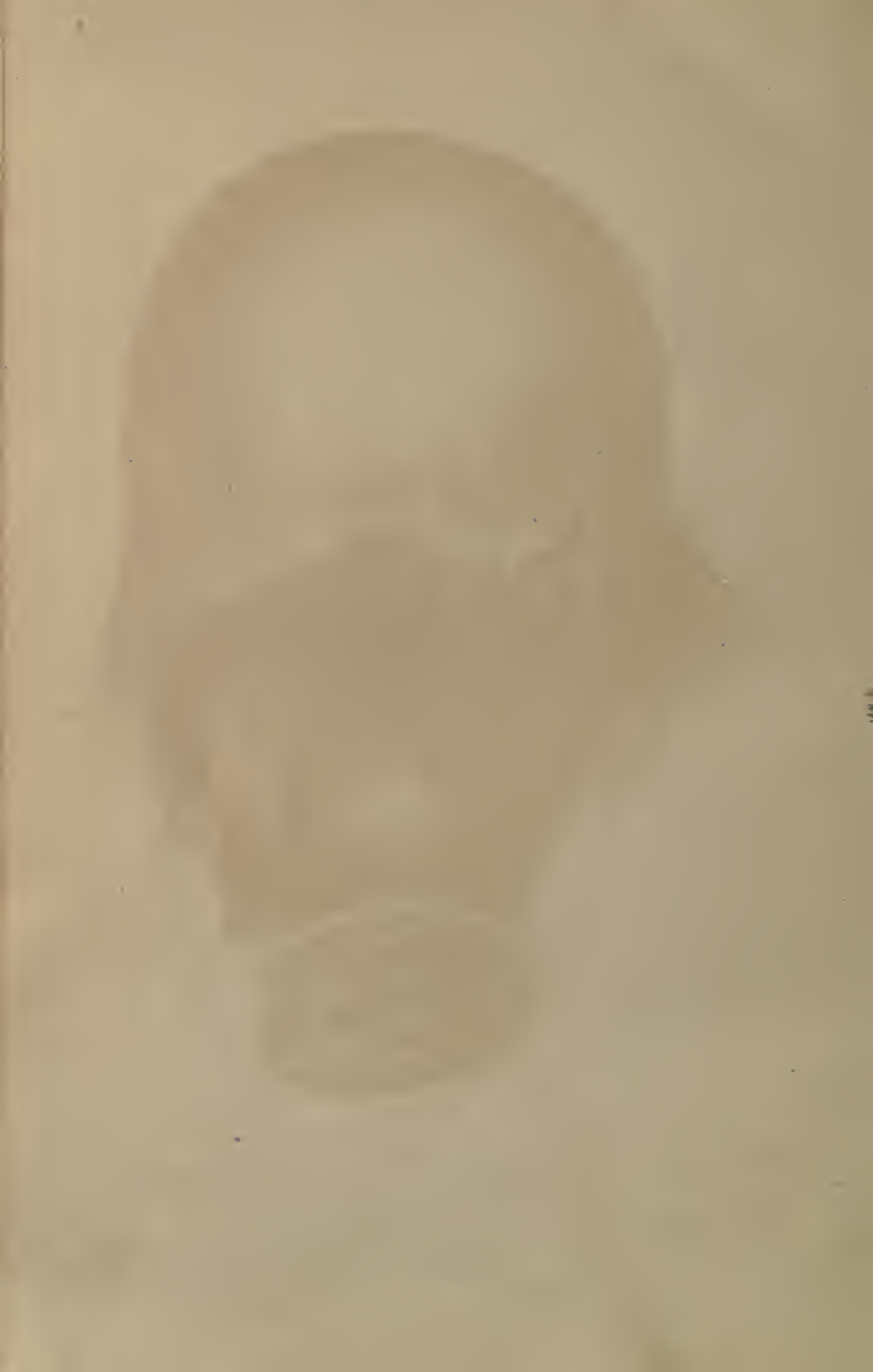
and temperature; a firm, unyielding condition of the upper uterine segment detected on palpation, and the exhaustion and irritability of the patient which are seen in delayed and complicated labor. The presenting part can often be felt through the abdominal wall projecting above the brim of the pelvis.

Actual rupture of the uterus is characterized by sudden cessation of uterine contraction, with the complaint of sudden and excruciating pain by the patient, followed by shock. The shape of the uterus changes, and an escaped portion of the fœtus can often be felt through the abdominal wall. Hæmorrhage through the vagina may or may not be present

The treatment of rupture of the uterus will depend upon the extent of the rupture and the possibility of delivering the child through the vagina. Where the uterus tears across the larger part of its anterior or posterior surface, the fœtus will escape into the abdominal cavity, and must be delivered by abdominal incision. The uterus can be sutured and allowed to remain, or removed with the ovaries, or amputated at the cervix. Where but a partial rupture occurs, the obstetrician will endeavor to deliver the child through the vagina, bringing the portion of the fœtus which escaped back into the uterus through its aperture of ex't. Version should be avoided if possible as likely to increase the rupture. The rent in the uterus may then be tamponed through the vagina with iodoform gauze, which is brought out through the vagina as a drain, or a drainage tube is inserted and gauze is packed about it. Under frequent disinfection of the vagina and irrigation through the uterine rent with boiled water, with the continued use of the tampon or drainage tube, a considerable proportion of cases of partial rupture recover. In complete rupture, if delivery be effected promptly and the uterus be skillfully sutured or removed, the patient may recover. In either case uterine rupture is one of the gravest accidents of labor.

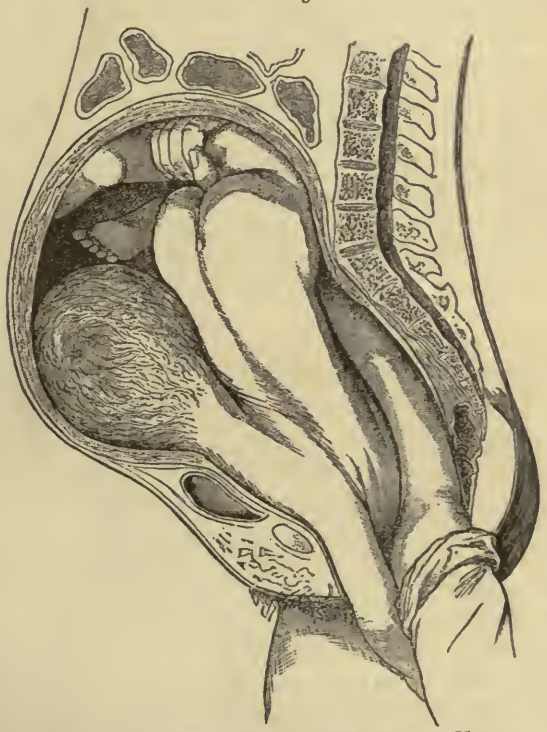
Where rupture is threatened, prompt action is necessary. It is of first importance to secure uterine relaxation and relieve the condition of uterine tetanus existing. This is best effected by

Transverse Rupture of the Anterior Cervical Wall.
(Spiegelberg)



deep chloroform anæsthesia, this anæsthetic being superior to ether for such cases. The injection of morphia is also of value, and the hot bath or hot applications have been found useful. Brandy may be given by hypodermic injection in free doses. If the fœtus is dead, it should be delivered in the manner least likely to injure the mother; embryotomy will usually be advantageous.

FIG. 113.



VERSION IN THREATENED RUPTURE OF THE UTERUS.

If the fœtus lives, version or forceps will be chosen, as the presentation and dilatation of the birth canal may indicate; version *before* uterine rupture and under deep anæsthesia being a most valuable expedient (Fig. 113).

Fœtal mortality in threatened and actual uterine rupture is very high. Long continued pressure by the upper uterine segment, and the inspiration of blood and abdominal fluids, where the fœtus escapes into the abdomen, usually kill the fœtus by asphyxia. Its chance for life is so slight that it is commonly disregarded in the presence of the great danger which threatens the mother, except in very favorable cases.

Inversion of the Uterus.—By traction upon the placenta through the cord, by sudden violent pressure upon the fundus, and by spontaneous, but forcible uterine contractions, the womb may be inverted or turned wrong side outward. This accident is most apt to happen to weak and exhausted patients, in cases where the uterus has been over-distended during pregnancy and labor, or in women whose muscular development is deficient.

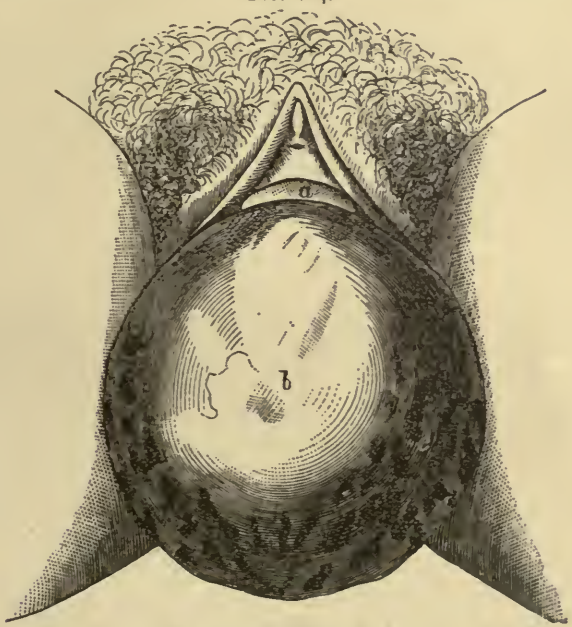
Symptoms of inversion of the uterus are pain, shock and hæmorrhage and the appearance of a uterine tumor in the vagina. This tumor may vary in size, from a mass the size of a large orange in cases where the fundus only is inverted, to a tumor as large as a man's two fists hanging between the thighs. The diagnosis of an inverted uterus is not always easy. A prolapsed and inverted bladder and a fibroid polyp of the uterus may simulate the inverted uterus. Should the placenta be adherent, it will be at once evident that the tumor is the uterus. A diagnosis in these cases is to be made by a careful examination. The bladder must be emptied by a catheter; bimanual examination will reveal the absence of the uterus above the pubes, and an attempt to pass a sound into the uterus will demonstrate the nature of the accident (Fig. 114).

Uterine inversion is one of the most serious accidents of labor. Death from exhaustion soon after labor, or from sepsis if the patient survives the accident, commonly results when inversion is complete. The treatment of this condition consists in restoring the uterus to its normal condition. Pressure by the antisepticized hand, the uterine tissue being protected by a pad of antiseptic gauze, should be immediately made upon the fundus, in the pelvic axis. While force must be exercised, it should be

done in a gentle, steady manner, and should be continued for from five to fifteen minutes at a time, with counter pressure over the pubes. The patient's general condition demands attention in these cases; antiseptic douches are of value in promoting reposition and preventing sepsis, and pain should be mitigated by the injection of morphia and atropia, and shock combated by the injection of brandy or ether.

If the physician be called to a neglected case of inversion of

FIG. 114.



INVERSION OF THE UTERUS.
a Upper vaginal wall. *b* The inverted uterus.

the uterus in which septic infection is threatened by an infected uterus, its removal will afford the patient her best chance for life.

LACERATION OF THE CERVIX UTERI occurs in the majority of first labors, but is slight in extent. Under precautions to avoid

septic infection, such lacerations heal without suture. In cases of rapid delivery, and in spontaneous, precipitate labors, laceration extending to the attachment of the vagina may occur, causing hæmorrhage, which demands treatment. Immediate suture is the proper treatment for such an accident. One suture of stout silk, catgut or silver wire on each side will commonly result in good union. If the patient is too exhausted to permit of suturing, iodoform gauze tampons may be used to check hæmorrhage.

CHAPTER XXXVII.

LACERATION OF THE PERINEUM AND PELVIC FLOOR.

LACERATION of the perineum and pelvic floor requires the prompt attention of the physician. This accident occurs more frequently than many practitioners will admit, as its confession implies a want of skill in the minds of many. If all lacerations which extend beyond the fourchette, or posterior commissure, be called laceration of the perineum, many of the marvellous records of hundreds of cases without a laceration would disappear. Clinically, all lacerations which extend beyond the fourchette should be sutured whenever possible. In hospital practice this can be readily accomplished; in private practice the physician is often led to omit suture and depend upon spontaneous union under cleanliness. It is true that union often results in laceration of moderate extent without suture, but such treatment is not the most scientific and thorough. It is the rule among careful obstetricians to suture all lacerations half an inch in length, including the posterior commissure, and certainly no great mistake can be made by following this rule.

If free hæmorrhage exists, a tampon of gauze may be applied, and the obstetrician will wait for several hours until it ceases. He may also wait for daylight and to secure rest for his patient to advantage. In lacerations not extending to the rectum, silk or silver wire may be used to advantage for suture material. In lacerations to or through the bowel, catgut will be needed in addition to the other. A curved needle upon a handle is preferred by some; others use the ordinary curved surgeon's needle, in needle forceps. The patient is brought to the edge of a bed or table, her feet in chairs or supported by assistants. Except in immediate suture, or where but one or two stitches are required,

Fig. 115.

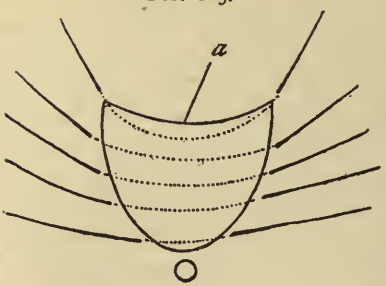


Fig. 116.

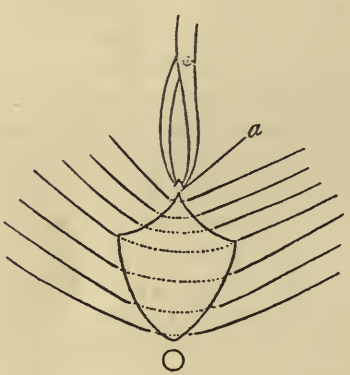
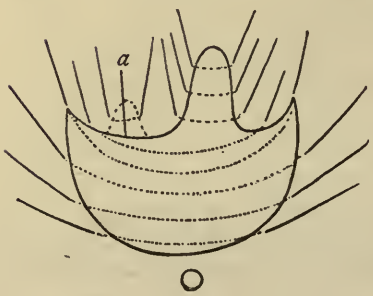


Fig. 117.



anæsthesia is necessary for an accurate closure. The operator will require needles, needle-holder, or needle on fixed handle, scissors, a pair of tenaculum forceps or a tenaculum, a pair of hæmostatic forceps and suture material. A vaginal douche of a gallon of bichloride solution, 1 to 5000, at a temperature of 100° F., may first be given. Antiseptic precautions having been taken with the operator's hands and instruments, a simple laceration, as shown in Fig. 115, is to be closed with silk or silver wire, by passing the sutures beneath the entire wound from the lower end upwards. The letter *a* represents the highest point of the laceration. In Fig. 116 the same laceration has been altered in its shape by drawing the point *a* upwards with a tenaculum forceps, for convenience in approximation.

It is frequently the case, in primiparæ especially, that in addition to a central tear in the perineum, lacerations are found extending up into the vaginal tissues on one or both sides. In Figs. 117 and

118 such lacerations and their closure are illustrated by diagrams, the point *a* being the highest point in the true perineal laceration.

In Fig. 119 the method of closing a laceration extending into the bowel and upwards into the vagina on each side is illustrated. The bowel is closed from within outwards by stitches of fine catgut, and the laceration is thus converted into one illustrated in Fig. 120, and closed by silk or silver as there represented. When an obstetrician has become experienced in the use of catgut, and possesses catgut of good quality, he may close perineal lacerations by the continuous catgut suture as shown in Figs. 121 and 122. Where primary union does not result after the closure of perineal injuries, in eight or ten days after operation the patient may be anæsthetized, the granulating surfaces scraped with a curette and closed by suture. If thoroughly done this procedure rarely fails.

FIG. 118.

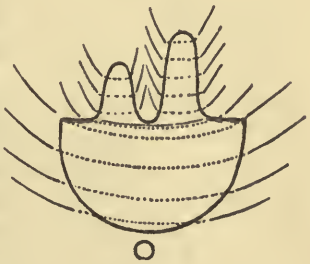


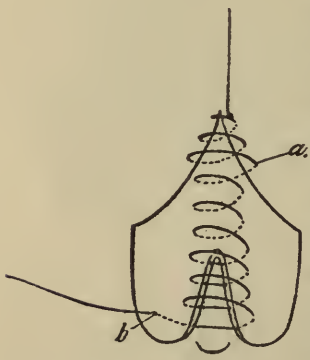
FIG. 119.

FIG. 120.

The after treatment of these cases consists in careful antisepsis. Three or four douches to the perineum and lower portion of the vagina should be given in twenty-four hours of bichloride solution, 1 to 8000, or creolin, 1 per cent. Antiseptic pads or napkins should be kept on the vulva. The use of the catheter should be avoided, and the parts cleansed after each urination instead. Loose bowel movements should be obtained after the third or fourth day. It is an unnecessary precaution to bind the legs

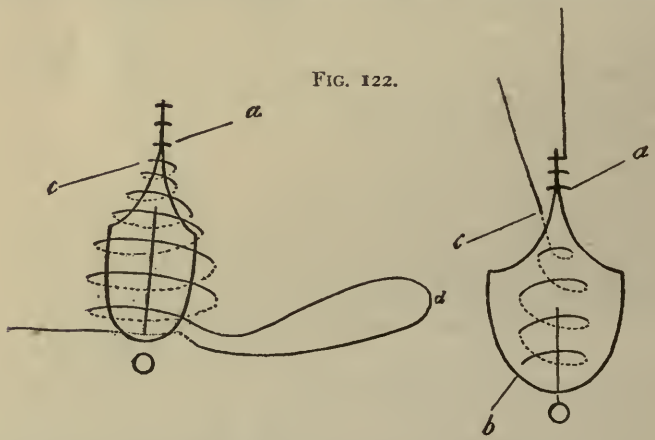
together in rational, reasonable patients. If the sutures do not annoy the patient they may remain ten days, when union results. In extensive laceration they may be left two weeks. The patient should remain recumbent for at least two weeks after the laceration is closed.

FIG. 121.



SUDDEN DEATH DURING LABOR is caused by the formation of a clot in the heart, by the entrance of air into the circulation through the uterine sinuses, and by sudden shock and syncope occurring after uterine rupture. The symptoms of threatened death are those of cardiac syncope, faint rapid pulse or sudden cessation of the pulse, pallor of the features, sudden mental alarm and distress, with rapid unconsciousness. The most prompt stimulation for the heart and brain is demanded. Hypodermic injec-

FIG. 122.



tions of ether, raising the foot of the bed several feet, atropia, ammonia and brandy or whiskey by hypodermic injection, and

where oxygen is available the inhalation of this gas are all demanded with the greatest promptness. Manipulations to accomplish delivery must cease, and attention be given to resuscitating the patient. Unfortunately many of these cases perish before more than one effort can be made to save them. The possibility of heart-clot and the entrance of air through the placental site should be borne in mind in cases of post-partum hæmorrhage, and such patients should not be allowed to sit up and should be prevented from sudden exertion so far as possible. In removing a placenta in these cases, as little violence as possible should be exerted, and uterine contractions maintained by pressure and massage over the uterus.

THROMBOSIS OF THE VEINS ABOUT THE VULVA AND VAGINA is an accident of labor which may result from violence during delivery or without apparent cause. The appearance of a bluish-red tumor near the labium, with the complaint of pain on the part of the patient, enables the physician to recognize the accident. If labor can be completed without rupturing the tissues which cover the thrombus, care should be exercised that the external air does not find entrance. If bleeding goes on and the thrombus is accompanied by the extravasation of blood into the cellular tissue through the rupture of capillary vessels, the tumor should be laid open under careful antiseptic precautions, the clot turned out and the cavity packed with antiseptic gauze. Labor should then be completed, and a compress and antiseptic napkin worn after delivery. The after-treatment of such a cavity consists in its thorough disinfection, and securing healing from the bottom by the continued use of the tampon. When labor is completed without rupture, an antiseptic pad and pressure by a T bandage will favor the absorption of the clot.

In difficult delivery by forceps or version and extraction the PUBIC JOINT has been RUPTURED. This accident is marked by sudden pain, and yielding of the joint which is appreciated by the physician. It may or may not be accompanied by laceration of the tissues beneath the pubes. If the joint surfaces do not become infected by sepsis compression, by plaster-of-Paris bandage,

or by a firm binder is sufficient. Suppurating arthritis has followed injury to the pubic joint during labor, making it necessary to drain and disinfect the articulation. Recovery, with firm union, usually results in these cases.

In sudden death during labor the physician's duty to the unborn child is a subject of interest and importance. Immediate delivery is the indication, to be accomplished as the circumstances of the case will best permit. If the genital canal is dilated and the head or breech presents the forceps may be found efficient. In multiparæ, where the fœtus is not favorably situated for the application of forceps, version has been successful. Where the genital canal is undilated, the extraction of the child by Cæsarean section is indicated where the pregnancy is sufficiently advanced to give reason to hope that the fœtus can survive.

CHAPTER XXXVIII.

PUERPERAL SEPSIS (PUERPERAL FEVER).

The most important, because the most deadly complication of labor and the puerperal state is septic infection. At the present day it is quite needless to raise the question as to the nature of puerperal fever. The exact mode of its origin may not be clearly proven, but the fact that it is an infection, produced by an infecting agent which can be communicated, rests upon grounds beyond question. By puerperal fever we do not refer merely to rises in temperature occurring after labor; such fevers will be considered later. But prolonged variation in pulse and temperature of considerable degree, accompanied by constitutional symptoms which denote the presence of an actively poisonous agent, and by anatomical lesions, necrotic in character, form together a clinical picture formerly named puerperal fever, better known as puerperal septic infection. This disorder is identical with septic infection occurring in any recently wounded patient, whether a man crushed by machinery whose wounds become infected during handling by a careless surgeon, or a woman whose torn perineum is infected during labor by the dirty fingers of her attendants. This infection is produced by the action of living ferments, which directly destroy the tissue or plug up the circulatory channels of the body, or indirectly poison the patient by producing toxic alkaloids which are absorbed.

The question arises as to whether these infecting germs are always communicated from without, or whether they may be found independently in the patient's body; in other words, whether puerperal infection is ever auto-genetic. While it is true that the body of the healthy woman never contains and can never develop these germs, it is also true that in the course of.

diseases previously communicated to the patient, poisonous agents are introduced which gain access to the wounds in the genital tract made during labor, and produce puerperal sepsis by infecting these wounds. Thus the germs of gonorrhœa, syphilis or cancer may be present in the body before pregnancy; and, finding access directly to the circulation through the wounds of labor, may produce sepsis.

The symptoms of puerperal sepsis will be best understood if we remember that the infecting germs may gain access through the lymphatics of freshly made wounds in the vagina and vulva, or go directly into the circulation through the open sinuses at the placental site. In the first instance vulvitis and vaginitis, with the formation of a puerperal ulcer, develop, in three or four days, from contact of a dirty hand or instrument in the vagina after labor. In the second mode of septic infection, the infected hand of a careless obstetrician, who performs version or separates and delivers an adherent placenta, lodges infecting germs in the uterine wall, where the placenta was attached, and direct infection through open sinuses results.

The course of puerperal sepsis can best be comprehended by recalling the anatomy of the lymphatics of the genital tract, as the infection usually follows the course of these channels. The lymphatics of the vulva and lower fourth of the vagina communicate with the superficial inguinal glands, and thence through the saphenous opening to the deep inguinal glands or along the deep blood-vessels, finally entering the abdominal cavity. An infection planted in the vulva or lower portion of the vagina may finally spread to the peritoneum. Considerable time would be required, however, for this result to occur, and the usual symptoms of vulvitis and vaginitis, with puerperal ulcers at the posterior commissure, would have given ample warning of threatened danger.

From the cervix uteri and upper three-fourths of the vagina, the lymphatics communicate with the deep iliac and sacral glands. Hence a focus of infection in the uterine cervix or in the upper part of the vagina readily infects the peritoneum.

In the uterine cavity lymphatic spaces are numerous in the uterine decidua, communicating with lymphatic channels in the serous covering of the uterus. From this surface lymphatics pass through the broad ligaments to the glands situated deeply on the posterior wall of the abdomen, in the lumbar region. It can readily be seen, then, how direct infection of the uterine decidua speedily causes peritonitis.

The least dangerous form of puerperal sepsis is vulvitis and vaginitis, resulting from infection of the vulva and lower fourth of the vagina. It is most common in women who have torn perinea or fissures in the mucous membrane at the opening of the vulva. In forty-eight to sixty hours after labor, the patient's temperature rises to 101° F., or 102°; slight pain, burning, smarting on micturition are felt about the vulva; a rigor may be experienced by nervous patients. The pulse is 100 to 120. On examination the labia are swollen, the mucous membrane reddened; at the posterior commissure abraded or lacerated surfaces are found, covered by a yellowish or faintly greyish deposit. The lochia may cease for a short time, to be slightly purulent and offensive later. If the perineum has been sutured, the surfaces will not be healing by first intention, but the edges of the wound will be separated by pus, and the stitches will have loosened slightly.

The treatment of this condition consists in douching the vulva and lower portion only of the vagina with bichloride of mercury solution, 1 to 5000, douches to be given four times in twenty-four hours. Half a gallon should be used for a douche, at a temperature of 100° F. The physician should thoroughly apply to ulcerated or fissured surfaces peroxide of hydrogen upon absorbent cotton, or tincture of iodine and a saturated solution of carbolic acid in glycerine equal parts, followed by the free use of iodoform or boracic acid as a dusting powder. It is well to thoroughly unload the bowels by calomel, gr. 2½, and soda, gr. 10, followed by a saline or an abundant hot enema. Abdominal pain is best relieved by placing upon the abdomen a flannel wrung out of hot water, on which spirits of turpentine have been

freely sprinkled. If stitches have been introduced, they should be at once removed, and ununited surfaces freely disinfected. The patient's diet should be of the most nutritious and digestible character, and alcohol should be given early to debilitated patients.

In cases where the infection begins at the uterus or upper portion of the vagina, the rapid spread of septic germs soon produces inflammation of the tissues about the uterus, and of the peritoneum which covers it. The first is *peri*metritis; the second, *para*-metritis.

The symptoms of perimetritis are tenderness on deep pressure at one or both sides of the uterus, with pain, fever and increased pulse rate. The symptoms of parametritis are pain on deep pressure directly over the uterus, swelling of the abdomen, with acute pain over the womb. Parametritis soon merges into general peritonitis, in which the abdomen becomes distended, very painful; the pulse rapid and feeble; fever continually high; while great thirst, prostration and often delirium complete a clinical picture of gravest import. If a vaginal examination be made in perimetritis, parametritis, or general peritonitis following either, an exudate will usually be found in one or both broad ligaments, which in some cases fixes the uterus as in a mould. Suppuration may occur in these cases, and pelvic abscess, limited by the pelvic peritoneum, which becomes inflamed and adherent, is frequently observed. Following parametritis the lymphatics of the uterine muscle become infiltrated with septic material, the muscle becomes enlarged and softened, and metritis is said to be present. The wall of a womb which is the seat of septic inflammation is much softer and more easily perforated than normally, and hence the need for caution in intra-uterine manipulation in septic cases.

Septic infection of the uterus produces first a brief cessation of the lochia, and then purulent, offensive lochia. The occurrence of the symptoms of perimetritis and parametritis, with foul lochia, leaves no room for doubt that the uterine cavity is in a septic condition. Its prompt and thorough disinfection is the imperative duty of the obstetrician.

After the vagina has been thoroughly disinfected by a copious vaginal douche of bichloride of mercury solution, 1 to 5000, the uterus should be explored and thoroughly douched. The patient should be placed across a bed or upon a table, her hips at the edge. A gallon of creolin solution, 2 per cent., carbolic acid, 2 per cent., thymol 1 to 1000, saturated solution of boracic acid, or alcohol 1 part and water 2 parts should be in readiness, at a temperature of 110° F. Bichloride of mercury should not be used for intra-uterine douches, on account of the danger of poisoning which attends its introduction into the uterus. As an instrument for douching the uterus, and also removing retained portions of placenta and membranes or diseased decidua, the writer has found Carl Braun's douche-curette of great service. This is a dull, spoon-curette upon a long, hollow handle, which may be connected with the hose of a fountain syringe. The syringe being filled with the antiseptic solution chosen for irrigation of the uterus, which is allowed to run through the curette, the curette is gently introduced, the cervix being steadied if necessary by grasping it and pulling upon it by a tenaculum forceps. While the antiseptic fluid continues to run, the endometrium is gently but thoroughly scraped by the curette, and thus the double purpose of an intra-uterine douche and an exploration of the uterine cavity is secured. After thorough cleansing of the uterus with the douche-curette, a suppository containing sixty grains of iodoform is grasped by uterine dressing forceps and carried well within the uterine cavity. After the use of the curette and iodoform suppository, it is often unnecessary, and even injurious, to enter the uterine cavity again with any instrument. If the uterus is once thoroughly disinfected, and symptoms of septic infection persist, the infecting material has entered the blood and must be combated by constitutional treatment.

If, however, the physician has no douche-curette and the internal os is not firmly contracted, an ordinary glass vaginal douche tube may be used. The stream should run freely through the tube, before it is introduced, to prevent the entrance of air, and the bag of the fountain syringe must not be higher than three

feet above the patient's bed. Many intra-uterine douche tubes are in market, and have their several advocates. In common with other instruments, that which is simplest and most easily cleaned is best. We have found an intra-uterine douche tube of hard rubber, made in two pieces, of great convenience. In cases where it is difficult to enter the uterus, this tube can be bent like a pessary to any curve. Its simple construction admits of its easy disinfection; the upper portion, which remains in the vagina, forms an excellent tube for washing out the fœtal head after craniotomy (Fig. 123).

Whatever douche tube be used, a fountain syringe and the force

FIG. 123.

HARD RUBBER INTRA-UTERINE DOUCHE TUBE.

of gravity is to be chosen for irrigating the uterus. The compression bulb syringe is not to be selected for this purpose, from the danger of the entrance of air and difficulty in cleansing the syringe. At least a gallon of hot antiseptic solution should be allowed to run before the tube is removed and the iodoform suppository introduced. The effect will be a powerful stimulation of uterine contraction and usually a fall in the patient's temperature. If the uterus shows a tendency to relax, ergot or quinine may be given to advantage. Four vaginal douches of bichloride solution, 1 to 5000, should be given in each twenty-four hours, and after a douche the iodoform suppository may be repeated, if needed. If the first disinfection has been thorough, it will rarely be necessary to repeat it, and the frequent use of intra-uterine douches is to be avoided. When foul lochia and fever persist, an intra-uterine douche may be given once daily for a few days.

In doubtful cases of fever after child-birth, it is the obstetrician's

first duty to examine the patient carefully for signs of septic infection. If no other cause, as fecal retention, be found for fever, the genital tract, from the fundus uteri to the vulva, should be thoroughly antisepticized. By so doing, sepsis is excluded, a diagnosis can be more readily made, and the patient's interests have not been jeopardized.

CHAPTER XXXIX.

THE CONSTITUTIONAL AND SURGICAL TREATMENT OF PUERPERAL SEPSIS.

Scarcely less important than the disinfection of the genital tract is the constitutional or general treatment of puerperal sepsis. We possess at present no antiseptic which may be introduced into a patient's blood in quantities sufficient to destroy the micrococci of sepsis, which will not destroy life, with the possible exception of alcohol. This drug, by reason of this property, and also its utility as a food, is especially adapted for use in these cases. As a rule, beverages containing a high percentage of alcohol are best borne and most advantageous. Brandy and whiskey diluted, or alcohol and water, are often tolerated when wines are refused. When wines can be taken, port and sherry are best adapted, and may be taken in quantities limited only by the patient's tolerance. It is impossible to give exact rules for the use of alcohol in sepsis. So long as the patient is not intoxicated, the breath not smelling strongly, the pulse becoming slower and stronger after administration of alcohol, it is doing good.

With the administration of alcohol goes, with equal importance, the giving of food. Milk, peptonized if needed, eggs beaten up with milk or whiskey, or brandy, freshly made broths, well seasoned and served hot, are the basis of feeding. Koumyss; rich, pure ice cream; milk, curdled by rennet, and scraped beef may be added if craved by the patient, and well borne.

The time and manner of feeding and giving alcohol cannot be understood without reference to the antipyretic treatment of puerperal sepsis. Of the various modes of lessening fever, the application of cold is best. Antipyretic drugs (antipyrin, antifebrin, phenacetin) are of value only as nervous sedatives. Their use in doses of fifteen to twenty-five grains obscures diagnosis

early in a case of puerperal sepsis, lessens the patient's strength, and impairs capacity for food and alcohol. Antipyrin in 5 grain doses, phenacetin in 5 grain doses and antifebrin in 2½ grain doses relieve nervous restlessness, and favor rest and sleep. They often take the place of opium for simple restlessness, without its injurious effects on digestion.

When fever rises to the point of oppressing the patient (103°, 104°, 105° F.) sponging with cold water should first be tried. Where cold water serves to depress the patient, rapid sponging with hot water, to which ammonia or alcohol has been added, may be substituted.

In either case heat is lost by evaporation from the patient's skin. If this suffices to refresh the patient, half an ounce of whiskey or brandy and a small cup of milk, or broth, or an egg may be taken. It will be found that antipyretic treatment of this sort and feeding can be given to advantage at convenient intervals, from every two to every four or five hours. When sponging does not suffice, the body pack is convenient and useful. This consists in exposing the patient's trunk, from the pubes to the episternal pit. Towels are then wrung out of ice water, and laid across the body from the pubes to the neck. By the time the last one is placed, the first is warm and should be removed, wrung out and replaced. By wringing them out in rotation an efficient and convenient pack is obtained, which may be given without wetting the patient's bed. The whole pack, in a wet sheet, and the cold bath are less often needed. In parametritis and peritonitis the ice bag or better, ice water coil, placed over the womb, is useful. The pain of abdominal and pelvic inflammation may be often relieved by turpentine stripes or by cold. When very severe, it must be controlled by morphia and atropia hypodermically.

The treatment of peritonitis by salines is useful only in the first few days of the attack. An eliminating diarrhœa is frequently observed in these cases and should not be checked unless excessive, when salicylate of bismuth in thirty grain doses will be found useful. So far as tonics are concerned, quinine in five grain doses, with pepsin, is of advantage in greatly debilitated patients.

The Surgical Treatment of Puerperal Sepsis is of importance, because a more extended trial of this resource may lessen the mortality of this disease. When pelvic abscess can be diagnosticated, it should be emptied and disinfected, either through the vagina or by supra-pubic incision. The symptoms of such abscess are an elastic tumor felt through the vagina beside the uterus, following septic infection, with the general symptoms of pyæmia.

When a collection of pus can be diagnosticated in the peritoneum, encysted by peritoneal inflammation and adhesions, incision and drainage are indicated. Continued peritoneal inflammation; protrusion of a portion of the abdominal wall with an area of well marked dullness, are diagnostic signs of encysted peritoneal abscess. The utility of laparotomy when diffuse general septic peritonitis is present is still a subject of investigation, and is not proven.

In puerperal sepsis of pyæmic character, abscesses may form in the serous cavities of the body including the joints, and by formation of septic thrombi and emboli in the connective tissues. Incision and drainage, with thorough antisepsis, is the only treatment.

In puerperal sepsis, infecting emboli and thrombi may be carried to any of the organs of the body. Thus an area of a lung may become infected by the lodging of an infected embolus, and septic pneumonia results. Hepatic, cerebral and splenic abscess have a like origin. Multiple joint emboli may simulate rheumatism. Sudden blindness, followed by the rapid destruction of an eye, denotes that an embolus has reached the eye. The statements of those who do not practise antiseptic precautions in obstetrics, and deny septic mortality are explained, in part at least, when we find that such practitioners lose patients from "malaria," from "pneumonia" and "jaundice" after confinement. A better knowledge of the pathology of puerperal sepsis would have enabled them to recognize in these cases the late complications of puerperal septic infection.

CHAPTER XL.

COMPLICATIONS OF THE PUERPERAL STATE.

In addition to septic infection, the puerperal patient is exposed to several complications which affect her recovery and the well-being of her child. The interests of both are involved in disorders of the breasts, and MASTITIS and ENGORGEMENT of the breasts are among the most common of these disorders.

ENGORGEMENT results from sudden distention, and from neglect to support the breasts and favor the free discharge of milk. The glands become greatly enlarged, the skin over them tense and shining, the veins well marked and the axillary lymphatics enlarged and tender. Lancinating pain is felt, extending into the axillæ. A rise in temperature to 100° F., and in nervous women a sensation of chilliness may be present, but no well marked rigor occurs, and the sharp disturbance which characterizes septic infection is absent The condition of engorgement predisposes to inflammation by causing congestion, but suppuration and septic fever do not occur unless a micrococcus finds access to the breasts through some fissure of the nipple or from the infected blood of the mother.

When pain and swelling of the breasts occur the obstetrician's first duty is to assure himself that septic infection is not present. Simple engorgement having been diagnosticated, the indications are to support and compress the breasts, to promote the free exit of fluid from them, and to promptly drain the lymphatic channels of the mother of a considerable quantity of fluid. The complaint of pain is to be met by the application of heat or cold, whichever the patient finds most grateful.

The breasts may be conveniently supported and compressed by the breast binder, which has been described in the treatment of

the normal puerperal state. By tightening or loosening the bandage and shoulder straps, and by observing that the apertures for the nipples are large enough to permit fluid to flow easily, the bandage will be of considerable service. Fluid may be removed from the engorged breasts by the breast pump, the simple bulb pump being best. The prompt use of saline laxatives will promote the subsidence of the engorgement; a teaspoonful of a saturated solution of magnesium sulphate, given every hour or half hour until free watery stools are voided, will be found useful. Over the bandage may be placed an ice-bag, or hot fomentation, as is most conducive to the patient's comfort. Her diet should be light, and fluid taken as sparingly as possible. The child may nurse at regular intervals; should symptoms of intestinal irritation appear, it may be fed for several meals until the secretion of fully formed milk is established.

Mastitis.—Septic infection may find access to the breasts and produce inflammation and suppuration. This complication of the puerperal state commonly accompanies the development of general septic infection, the infecting material gaining access to the gland through a fissure in the nipple. Mastitis is most often seen in women with poorly developed nipples, where the efforts of the child to nurse wound the epithelial covering of the nipple, and infectious material from the vagina or the child's mouth enters through the abrasion.

Symptoms of mastitis are pain, tenderness and swelling of the gland, with lymphangitis. The lymphatics of the breast show in reddened lines, the axillary lymphatics are large and tender, and a decided rise in pulse and temperature, with often a pronounced rigor, complete the clinical picture. Infection finding lodgement at the nipple may remain limited to the areola and tissues about the nipple, or, following the lymphatics deeper, may infect an acinus of the gland or several acini. Suppuration soon follows, and fluctuation can be detected on careful examination. In neglected cases the gland may become honey-combed by suppuration, and the pus may burrow in the axilla.

When the nipples are developed during pregnancy, the epithe-

lium healed by ointments, and antiseptic precautions are exercised in the conduct of labor, mastitis is infrequent. When it occurs, it should be treated by the measures advised for the treatment of engorgement, with prompt incision and disinfection when pus forms. A suppurating breast is to be treated like any other abscess. The child is to be taken from the affected breast at once.

CHECKING LACTATION.—When the fœtus dies and when the mother proves unable to nurse her infant, the secretion of milk must be checked, to prevent engorgement and threatened mastitis. Compression by the bandage, the application of cold, if the patient is not depressed by it, and the use of belladonna are indicated. A convenient and comfortable way of applying belladonna consists in cutting a circular piece of surgeon's lint, with an aperture to permit the nipple to protrude, smearing belladonna ointment upon it, placing it upon the breast and applying the compressing bandage over it. The breast should be disturbed as little as possible, tension being relieved by the cautious use of the breast pump, which does not require the removal of the bandage.

Where an ointment is objectionable, a similar piece of lint may be sprinkled with a solution of atropia, four grains to the ounce, and applied in the same manner. An eruption resembling that produced by croton oil occasionally follows the use of belladonna, but does not cause serious inconvenience.

Simple FISSURE of the NIPPLES will occasion pain when the child nurses, and, unless precautions are taken to avoid infection, soon ends in inflammation. Scrupulous cleanliness and the free use of boracic acid solution are indicated; the nipple must be protected by a nipple shield, and the application of an ointment of equal parts of cosmoline and lanoline, with ten grains of boracic acid to the ounce, or painting with the compound tincture of benzoin, will usually result in speedy cure. In neglected cases nitrate of silver may be required.

The tardy contraction of the genital tract to nearly its former dimensions is known as SUB-INVOLUTION. Septic infection and inflammation, retention of portions of the placenta and mem-

branes, and failure in the patient's nutrition and vigor are the most common causes. When the uterus continues large, and the vaginal walls remain relaxed and engorged with blood, the physician's first duty is to ascertain that no pathological condition within the uterus is causing sub-involution. The womb should be explored with the curette and thoroughly douched with a hot antiseptic solution. An iodoform or boracic acid suppository may then be left within the uterine cavity. The vagina should be examined to see that no ulcerated surface is present. Laceration of the cervix and perineum and vagina may be closed after the first ten days of the puerperal period, and if antisepsis be practised, such operations will be attended by little or no disturbance of the patient's general condition.

The constitutional treatment of sub-involution is scarcely less important than the local treatment of the genital tract. Constipation must be avoided; massage, judicious feeding, the administration of ergot, arsenic and nux vomica or strychnia, and oxygen are of great service. The upright posture is to be avoided for a considerable time; the patient can walk with less injury than when she remains standing. The avoidance of improper clothing is also of great advantage in preventing constriction of the abdomen, forcing the abdominal viscera downwards, and favoring prolapse of the genital tract.

In cases in which the bowels are not properly moved during pregnancy, fecal accumulation exists to a considerable degree. Unless especial precautions be taken to empty the large intestine thoroughly soon after labor, FECAL TOXÆMIA may occur. The absence of pain or tenderness about the genital tract; rapid pulse; fever (102–103° F.); perspiration; furred, coated tongue; and apathy and discomfort, with loss of appetite, are the usual symptoms of this condition in the puerperal patient. After a careful examination has established the absence of septic infection, free purgation will speedily terminate the disorder. The value of copious hot rectal injections in these cases is to be kept in mind.

Fever in the puerperal patient may also follow EMOTIONAL DISTURBANCE. A diagnosis in these cases must be made by closely

watching the patient and her surroundings, after a thorough physical examination has excluded septic or other acute infection and fecal intoxication. The removal of the perturbing cause, with the administration of a sedative addressed to the nervous system, will speedily end the fever.

CHAPTER XLI.

RETENTION OF THE PLACENTA.

While in normal cases the placenta is expelled within half an hour after the birth of the child, it is occasionally retained. It is to be remembered that a retained and an adherent placenta are very different in pathology and indications for treatment. Simple retention of the placenta results from atony of the uterine and abdominal muscles, and usually follows exhausting, complicated labors. In women of deficient physical development, in those whose nervous system has been greatly taxed by labor, and in cases where care has not been taken to secure good contractions of the uterine and abdominal muscles after the fœtus is expelled, placental retention frequently results. When summoned to such a patient, the physician will find the relaxation produced by exhaustion, or the tetanic, irritable contraction of the uterus which follows exhaustion of the nerve centres in some cases, demanding his attention. After carefully antisepticizing the vagina and his hands, a thorough vaginal examination will inform him regarding the case.

In atony and relaxation he will find the placenta in the lower uterine segment and cervix, an edge of placental tissue often accessible to his grasp. His left hand should rub the uterus to secure tonic contraction, and placing the thumb in the centre of the fundus and the flexed four fingers behind the uterus, it should be compressed downwards and slightly backward. Care should be exercised that the uterus is grasped in the centre and kept in the central line of the abdomen, as otherwise an enlarged ovary may be compressed, and violent pain and shock be inflicted. The fingers in the vagina will be able to assist in bringing the placenta into the vagina, whence it can be readily delivered. This method of uterine compression and placental delivery is known as Credé's.

Where the placenta is retained by a contracted but exhausted uterus, the condition of uterine tetanus must be first removed before the placenta can be delivered. So long as no hæmorrhage occurs, the pulse remaining good and the uterus readily outlined in the abdomen, rest without interference is often all that is necessary. Under careful observation the patient may remain quiet for half an hour or an hour, when massage will often cause a normal contraction of the uterine and abdominal muscles, and the placenta will be expelled. When the patient's condition demands the immediate removal of the placenta, an anæsthetic should be given, when the condition of tetanic contraction will yield and the placenta may be delivered by Credé's method. Chloroform is especially useful in these cases. In patients greatly prostrated by prolonged and difficult labor, the hypodermic use of morphia and atropia, and also brandy, may be indicated before anæsthesia can be prudently commenced.

Adherence of the Placenta and Membranes is the result of previous endometritis accompanying syphilis, gonorrhœa, or endarteritis of the vessels of the endometrium of unknown origin. In these cases the usual efforts at placental expulsion are made by the patient, but the placenta remains wholly or partly adherent to the uterine wall. This is among the most trying and dangerous of the complications of labor and the puerperal state. The indications are to remove the placenta and membranes, as the normal forces of labor cannot do so, and yet the effort to empty the uterus may result in violence and infection to the interior of the uterus. Under the most careful antiseptic precautions, with anæsthesia, a gentle but patient and thorough effort must be made to introduce the fingers or the entire hand within the uterus, peel off the placenta and membranes and remove them. The finger-tips should be turned toward the centre of the uterine cavity, away from the wall of the womb, to avoid wounding the endometrium, while the fingers separate the placenta as a paper-knife passes between the leaves of a book. After the removal of the placenta the uterus should be thoroughly disinfected, and an antiseptic suppository left within the cavity.

When, however, the placenta cannot be removed without violence, the obstetrician will do well to wait until necrosis of the cellular tissue where the placenta and uterine wall join has occurred, when the placenta can be removed. It is of the greatest importance that the genital tract be carefully maintained in an aseptic condition during this time. Four vaginal douches of bichloride of mercury 1 to 5000 may be given in 24 hours. The patient should wear an antiseptic occlusion dressing over the vulva. Her temperature is to be watched, and at any considerable rise the uterus must be emptied and disinfected. If infection can be prevented, in a few days the placenta will have been loosened by innocuous necrosis without suppuration. It is well to thoroughly curette the uterus after the delivery of such a placenta, to remove diseased decidua and endometrium.

CHAPTER XLII.

DISORDERS OF THE FŒTAL APPENDAGES.

Among the most common of the disorders of the fœtus and its appendages is DECIDUAL ENDOMETRITIS. Its cause is not clearly known, but several forms have been observed. Polypoid; diffuse or hypertrophic; cystic, and catarrhal changes in the decidua have been described. Catarrhal inflammation of the decidua may occasion confusion in diagnosis, from the fact that the discharge of a catarrhal secretion occurs during pregnancy, which may be mistaken for a discharge of amniotic fluid. When the fluid is closely observed, however, it will be found to be a mucous secretion instead of the yellowish amniotic liquid. When inflammation of the decidua persists, it not infrequently causes fœtal death. It is not amenable to treatment, and the physician can only confine himself to curing endometritis when the patient is not pregnant.

Adhesion of the Amnion and compression of the fœtal limbs is a frequent cause of malformation in the fœtal members. Webbed fingers and toes are often seen as a result of this condition. Amputation of a fœtal limb also follows this complication. Deficiency in the amniotic liquid (oligohydramnios) often accompanies amniotic adhesions, and malformations of the lower extremities are ascribed to this pathological condition.

Excess of amniotic fluid, POLYHYDRAMNIOS, may be diagnosticated by an unusual and symmetrical distension of the abdomen, with unusual mobility of the fœtus on palpation, and faint fœtal heart sounds on auscultation. It is sometimes dangerous by reason of the excessive size of the abdominal tumor and the enormously distended uterus which may threaten rupture. Pregnancy is often interrupted by the over-distended condition of the uterus, and at labor malpositions of the fœtus are caused by the sudden, free escape of an excess of fluid.

Ordinarily it is not necessary to interrupt pregnancy because of polyhydramnios, but caution should be observed at labor to avoid a malposition of the fœtus and prevent precipitate labor. In excessive polyhydramnios, fluid may be cautiously withdrawn by an aspirator needle or trocar.

The chorionic villi which form the placenta are occasionally the seat of a myxomatous degeneration which produces a VESICULAR MOLE. When the disease occurs before the formation of the placenta, the entire chorion may become involved; when limited to the placenta, the affection occasionally destroys the placenta entirely, substituting a mass of vesicles or cysts for normal placental tissue. Symptoms of myxoma of the chorion or vesicular mole are rapid increase in the size of the abdomen, uterine hæmorrhage at irregular intervals, and the discharge of grape-like cystic bodies. The death of the fœtus commonly follows this condition; interference is rarely indicated except in cases where the excessive growth and bleeding of the degenerated villi threaten the patient's strength, when the uterus should be emptied.

The PLACENTA may be the seat of syphilis, producing gummata, infiltration of the perivascular spaces, with cellular proliferation occluding the vascular spaces of the placenta. A syphilitic placenta is larger, heavier and paler than normal, and islands of syphilitic tissue can be detected by their grayish-yellow color. In non-syphilitic cases endarteritis of the placenta is also observed, of unknown origin. Apoplexy of the placenta results in destroying the function of limited areas, and such areas may be recognized by hæmatine staining, visible on inspection. Fatty and calcareous areas are observed in placentæ otherwise normal, and in cases where the fœtus is normal.

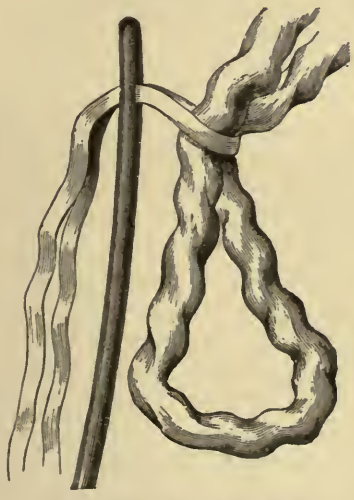
The UMBILICAL CORD may be abnormally long, or deficient in length. The first condition predisposes to the formation of knots and coils about the fœtus, and may lead to fœtal death by asphyxia. A short cord may occasion delay in labor by preventing the descent of the fœtus, and may result in premature separation of the placenta.

The coiled condition of the cord about the fœtus may be diag-

nosticated in some cases by the detection of a murmur in the cord. When a sound synchronous with the fœtal heart sound, and complicated by a murmur resembling a very faint cardiac murmur can be heard, a presumptive diagnosis of a cord coiled about the fœtus may be made. A positive diagnosis cannot be established before labor. When the head is born and the cord is found coiled around the neck, the endeavor should be made to slip it over the head or shoulders by loosening it with gentle traction. Failing in this, it should be ligated, and delivery hastened. The fœtus is often asphyxiated in these cases.

Prolapse of the cord during labor threatens the life of the fœtus from compression and asphyxia. An endeavor may be made to replace a prolapsed cord by passing a doubled piece of silk ligature or a string through an English catheter, bringing it out at the eye, passing it about the cord and catching the loop of ligature over the end of the catheter. By pulling upon the ligature at the end of the catheter the cord can be kept firmly grasped while the catheter and cord are passed into the uterus; then the ligature is slackened, the catheter withdrawn and the ligature slips off the end of the catheter, leaving the cord in the uterus (Fig. 124).

Fig. 124.



Replacing the Cord with a Catheter.

The most efficient treatment of prolapsed cord consists in anæsthetizing the patient and placing her in the left lateral or knee chest position. If this is impossible she may lie across a bed, with her hips at the edge and raised several feet above her shoulders. The cord is then grasped by the antisepti-

cized hand and carried into the uterus and placed above the fœtus. If it cannot be felt to pulsate, or if it persistently prolapses when the grasp of the physician is relaxed, the child should be at once delivered by version and resuscitated if possible.

CHAPTER XLIII.

DISORDERS OF THE FŒTUS.

THE fœtus while in the womb is subject to disease and to malformations, which may cause its destruction or complicate labor.

EXCESS OF DEVELOPMENT in the fœtus occasions difficult labor and the effort to complete delivery often results in injury which may prove fatal. In performing version and extracting a large child, fracture of the clavicle not infrequently occurs. In bringing down an arm when it has become extended in breech labor the humerus is not infrequently fractured. Such, however, are rarely compound fractures, but are what are known as "green stick" fractures, in which the periosteum is not ruptured, but the fragments are retained as the pieces of a sapling are held by its thickened bark. These cases require simple retention dressings, and union without deformity usually results.

Injuries to an unusually LARGE FŒTAL HEAD by forceps were considered when treating of that instrument. As the surgical treatment of complicated labor becomes better known and more extensively practised, the conservative abdominal operations will render the extensive and often fatal injuries to the head caused by the irrational use of forceps to become practically unknown.

DEFICIENCY IN FŒTAL DEVELOPMENT, when it causes a symmetrical but undersized fœtus, results in precipitate labor in vigorous women. Should a small fœtus assume a complicated position, it can be most safely delivered by version, as the grasp of the forceps is not secure upon a small head.

The after treatment of ILL-DEVELOPED CHILDREN requires the exercise of great care and patience. When such infants show a persistent tendency to abnormally low temperature, they should be kept in an incubator, and removed only when necessary to

obtain food or maintain cleanliness. A simple but efficient incubator may be prepared by using an ordinary large clothes-basket as a crib, and surrounding the child by bags of sand, which may be heated. If an abundance of padding be supplied and a sufficient number of sand-bags, so that some can be constantly heating while others are changed, a temperature of 100° F. can be readily maintained. More elaborate and efficient incubators are Tarnier's and Auvard's simpler form of Tarnier's, in which hot water supplies heat.

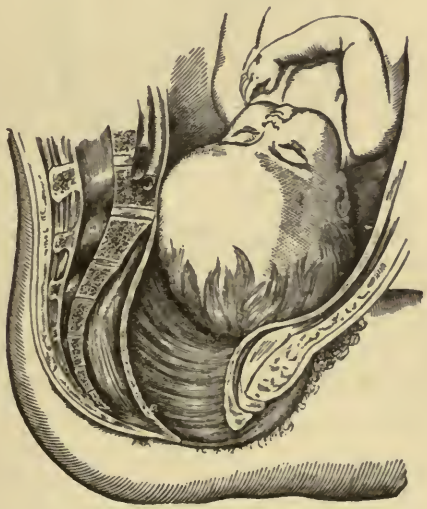
In ill-developed children who have not strength sufficient to suck the breast, it is often necessary to obtain milk by a breast-pump and feed it to the child by a spoon or medicine dropper. Milk may be introduced into the stomach by passing a small soft catheter into the stomach, attaching a funnel to it and pouring milk through the funnel; this is known as gavage. By the use of the incubator and by careful feeding, the age of viability for infants has been advanced to 6½ in place of 7 months.

The presence of a TUMOR in some portion OF THE FŒTAL BODY may threaten fœtal life and complicate labor. Such are a congenitally enlarged thyroid gland producing goitre; enlarged spleen from malaria or sarcoma; sacral tumors associated with defect in the walls of the spinal canal and the protrusion of the membranes and fluid; cerebral meningocele or deficient cranial walls with protrusion of the brain and its membranes and fluids; and hydrocephalus. In all of these cases the continuance of the child's life, even if labor be successfully accomplished, is very doubtful. Hence the mother's interest must be wholly paramount, and, before the fœtus becomes impacted, embryotomy is indicated. The most common of these conditions is that of dropsy of the cerebral ventricles, with distention of the brain and its coverings. This pathological state varies in severity from cases associated with rhachitis, in which recovery ensues, to instances of excessive distention of the brain and cranium, in which cerebral functions and even the continuance of life are impossible.

The presence of a HYDROCEPHALIC SKULL is diagnosticated by feeling a smooth, slightly elastic tumor without bony landmarks

in place of the ordinarily ossified head. Examination under anæsthesia with the greater portion of the hand will confirm the absence of the sutures and fontanelles. Delayed or suspended labor results from the presence of a hydrocephalic head of considerable size. The mistake of applying the forceps to such a head must be avoided; the grasp of the instrument would be insecure, and slipping and wounding of the mother's tissue would result. The head must be lessened in size by evacuating a portion of the fluid. When the distention of the head is not exces-

FIG. 125.



LABOR DELAYED BY HYDROCEPHALIC HEAD.

sive, a fine trocar may be employed, in the hope that when a portion of the fluid has been removed, labor pains may compress and expel the head. Where the head is so large that no such result can be reasonably expected, it is best to perform craniotomy, empty the head of a considerable portion of the fluid, and deliver it by the cranioclast (Fig. 125).

The hydrocephalic head not infrequently lodges in the fundus

of the uterus, the fœtus assuming a breech presentation. In these cases craniotomy on the after-coming head is the most

FIG. 126.

HYDROCEPHALUS AND BREECH PRESENTATION.

effective treatment. When the skull cannot be readily reached, the spinal canal may be opened and fluid drained in that manner (Fig. 126).

CHAPTER XLIV.

MONSTERS: FŒTAL DEATH IN UTERO.

DEFICIENT development in various portions of the fœtal body causes deformities so unnatural in appearance that such a fœtus is called a monster. Single monsters (a single deformed fœtus) are often the blighted one of twins, the living, normal fœtus having so appropriated the tissue and pabulum of the other that but a portion of the body has developed. Monsters may be conveniently divided into those which can exist alone (autositic) and those which depend upon the placental circulation of a second fœtus, so that the monster's life ceases when the umbilical cord is cut (omphalositic).

Among the autositic monsters are the ectro-melic, with the absence of a limb; symelic, the limbs joined; celosomatic, the abdominal wall almost entirely deficient; exencephalic, the cranial bones lacking; pseudencephalic, brain and cranial bones but slightly developed; anencephalic, with brain and skull lacking; cyclocephalic, eyes fused; otocephalic, ears joined, face lacking. The omphalositics are the portions of a blighted twin, the other normally developed. They are deficient in cardiac formation (acardiac), or have no head (acephalic), or lack a trunk (asomatic), or have no well-defined shape (fœtus amorphous) (Fig. 127).

Double monsters are most often joined twins, or a normal fœtus, with several limbs or parts of a second fœtus joined to the body of the first.

Although even double monsters are often delivered spontaneously, yet should impaction and delay in labor occur, embryotomy should be at once performed.

DIAGNOSIS AND TREATMENT OF FŒTAL DEATH IN UTERO.—When fœtal death occurs it may be diagnosticated by the cessation of heart sounds and movements. Progressive diminution in the size of the mother's abdomen is also a symptom of diagnostic

importance. If no interference be practiced, a dead fœtus is usually expelled spontaneously in less than a month after the fœtal death. If retained, it may become soaked in amniotic fluid and the serum of its own blood (macerated); or shrivelled (mummified); or

FIG. 127.

ANENCEPHALIC MONSTER.

hardened (a lithopædion). Putrefaction will not take place unless air gains access to the fœtus through rupture of the membranes.

When fœtal death has been diagnosticated, labor should be induced by a bougie. If the fœtal membranes have been ruptured and putrefaction be present, dilatation must be cautiously effected, the fœtus removed and the uterus disinfected.

CHAPTER XLV.

DISEASES OF THE NEW-BORN CHILD.

FAILURE of oxygenation of the fœtal blood is a common disorder attending labor and persisting for a few hours during the puerperal state. It is commonly known as ASPHYXIA, and is of two degrees. The first is that in which the child's color is dark red, the heart beats slowly, the mouth grasps the physician's finger, the reaction to counter-irritants is present, respiratory movements are present although feeble. This condition is often accompanied by cerebral compression from hæmorrhages on the surface of the brain, following compression of the skull during labor. Where hæmorrhage is not present, efforts at resuscitation are commonly successful.

The second stage of asphyxia is the "pallid asphyxia" of some observers. The child's body is a bluish-white; the muscles relaxed; feeble efforts at respiration or deglutition are present; a very feeble heart impulse can be observed. The eyes react but slightly to light. In these cases treatment is often unavailing. Children suffering from diseases which make the establishment of respiration impossible through constitutional weakness often survive labor for several hours or a day. Such children have gasping respiration; are red in color; lie in a condition of stupor; moan in an unconscious manner, and swallow nourishment with difficulty. When an autopsy is made on such a child, a condition of atelectasis is commonly found in the lungs. The portions into which air has not entered sink in water, are dark red or violet in color, show a smooth surface when cut, with no mucus on pressing upon the cut bronchial tubes.

The treatment of asphyxia has been already stated under the treatment of labor in breech presentation. Children who have

been resuscitated from asphyxia should be kept in an incubator for several days, and require careful attention as regards the maintenance of the circulation and the promotion of nutrition.

Septic Infection in the New-Born Child.—Septic infection may find lodgment in the child's body through the umbilicus or a mucous surface. Among the latter varieties of sepsis are septic imflammation of the conjunctivæ, of the mouth, and in female children of the vulva. The first results in ophthalmia neonatorum.

The symptoms of ophthalmia of the new-born are redness and swelling of the lids, with a muco-purulent secretion. If allowed to go on, infiltration and sloughing of the cornea, with perforation and intra-ocular abscess, may destroy sight.

In proportion as antiseptic precautions are taken regarding the condition of the mother's genital tract before labor and the avoidance of infection during labor, ophthalmia disappears. When the gonococcus, however, is present in the vagina before labor and infects the eyes, the after-treatment is often unsuccessful. In many hospitals a drop of a 2 per cent. solution of nitrate of silver is dropped into the eyes, after douching them with boiled water. In hospital practice this precaution gives excellent results. Where the genital tract is known to be aseptic before delivery, it is unnecessary. So soon as the disorder is recognized, if one eye only is affected, the other should be closed and protected by an antiseptic pad and bandage. The inflamed eye is then to be douched with a saturated solution of boracic acid every hour or half hour, in alternation with bichloride of mercury solution 1 to 8 or 10,000. This is best accomplished by placing the warmed solution in a fountain syringe, using a medicine-dropper in place of the usual nozzle. The child is placed across the nurse's lap, its arms confined by a blanket, its inflamed eye lying lower than the other. While the lids are gently separated with the fingers of one hand, with the other the stream is directed from the nasal side of the lids to the outer canthus. The fluid is conducted by a rubber sheet into a receptacle and thus infection of the other eye is avoided. The eyes should never be wiped or rubbed with bits of cotton as is so often done. It is well to dilate the pupils with

atropia early in the case. Where swelling and redness are excessive, compresses dipped in an iced solution of boracic acid may be kept constantly upon the lids. The occasional application of a solution of silver nitrate, 20 grs. to the ounce, is useful in severe cases, if it can be done by a thoroughly competent person. The infection of ophthalmia is very virulent, and great care must be exercised by nurses and attendants to avoid the transmission of the virus.

Umbilical sepsis is marked by redness and swelling of the umbilical tissues, with fever. Occasionally the infection passes directly through the lymphatics into the general circulation, while no local symptoms are present. Various micrococci may cause umbilical sepsis, among them the germ of erysipelas.

The mouth may be invaded by various forms of bacteria. Most common is a fungus called the sprue fungus, which forms white patches upon the mucous membrane. It occasions considerable irritation, and may be swallowed and disturb the intestinal functions. It is best treated by allowing the child to swallow slowly a teaspoonful or half teaspoonful of solution of boracic acid, from 5 to 10 per cent. in strength, given with some palatable vehicle, several times daily. Where boracic acid is used freely in cleansing the nipple, the development of sprue (or thrush) is rare.

In diphtheritic inflammation of the vagina at labor, the diphtheritic virus may become transferred to the child's mouth, and set up a like process in the fauces.

The child may inspire septic material from the vagina during complicated labor, in which asphyxia is threatened and respiratory movements occur. Inspiration pneumonia follows, and is often fatal.

Malignant jaundice, tetanus, acute hæmoglobinuria of the newborn are the results of infection by agents not yet clearly known: the results of these infections are fatal, treatment being simply palliative. Hæmoglobinuria is associated with cyanosis, jaundice and hemorrhages from various organs; the disease is called by Winckel, hæmoglubinuria. The bacillus of tetanus usually finds entrance through the umbilicus.

THE UMBILICUS may be also the seat of hæmorrhage after the ligation and cutting of the cord. This may arise from fungous granulations or from a brittle condition of the blood vessels. If pressure by an antiseptic pad fails to stop such hæmorrhage, two needles may be passed at right angles beneath the bleeding tissues and a figure-of-eight ligature applied.

Besides the caput succedaneum, which disappears in a few days after labor, CEPHALHÆMATOMA may be present. This is a tumor formed by the extravasation of blood between the periosteum and cranial bones, usually situated on or near a parietal bone, and varying in size from a walnut to an apple. The blood is dark, like syrup. The tumor is not painful, and has a tense, hard edge. If the tumor be opened, the blood reaccumulates.

Cephalhæmatoma may also be internal, the blood being situated between the bone and internal periosteum. External cephalhæmatoma is rarely dangerous; when internal it is accompanied by the symptoms and dangers which mark cerebral compression.

Cephalhæmatoma may be left to be absorbed spontaneously, or incised, emptied and compressed. If incised it should be done six or eight days after the tumor is discovered. If antiseptic precautions be observed, incision may be practiced with impunity.

THE BLOOD of the newborn infant may become so disordered that passive hæmorrhage from the mucous surfaces may threaten the child's life. When the blood is very fluid and very dark in color the condition is known as melæna neonatorum. Such disorganization of the blood is invariably fatal.

SYPHILIS and RHACHITIS are among the most important of the constitutional and deforming diseases of the fœtus. The former is known by the pallid, clay-colored complexion of the fœtus; the coryza which is present at birth in many cases, and the pemphigoid eruption which appears a few days after birth over the whole body. If the body of such a fœtus be examined, the liver and spleen are found enlarged, perhaps containing gummata. The lungs are the seat of a fibroid pneumonia; the bones exhibit a reddish-yellow streak just above the epiphyses (Fig. 128), which is caused by the proliferation and fatty degeneration of syphilitic,

cellular tissue. The nostrils of such a fœtus are thick; its limbs poorly developed; its tissues ill-nourished.

The rhachitic fœtus has the projecting forehead, the enlarged epiphyses of the long bones, the "beads" along the ribs where

FIG. 128.

FŒTAL BONE, SYPHILIS, SHOWING SYPHILITIC LINE.

they join the sternum, the projecting sternum and spinal curvature which so often mark this disease.

Syphilis may be treated by calomel, gr. $\frac{1}{20}$, with soda; by inunction of mercurial ointment or the hypodermic injection of bichloride of mercury, $\frac{1}{100}$ of a grain in solution. Syphilitic eruptions and sores may be dusted with calomel. Cod-liver oil is indicated in both syphilis and rickets.

APPENDIX.

THE following memoranda and formulæ have been found of practical interest and value:

ANTISEPTICS.—Bichloride of mercury is best used for cleansing the hands of the obstetrician and the external genitals of the patient. It has caused poisoning in vaginal douches, 1 to 5000. It should not be employed for intra-uterine douches, as fatal poisoning may readily follow such use. Bichloride is usually sold in tablets. When these cannot be obtained, the following powders will be found convenient:

Bichloride of mercury	grs. 10
Tartaric acid	grs. 49
Cochineal	gr. 1

One powder dissolved in one pint of water makes a solution, 1 to 1000. When a solution of bichloride is turbid, common salt may be added to favor complete solution. In strength of 1 to 2000 it may be used for cleansing the hands and external parts; in 1 to 5000 to 1 in 10,000 for vaginal douches. Bichloride solution, 1 to 1000, is useful to cleanse rubber articles. Symptoms of bichloride poisoning are salivation, sore teeth and gums, mucous, bloody diarrhœa, rapid pulse, prostration, coma, death. Treatment consists in stopping the use of the bichloride, using a mouth wash of equal parts of potassium chlorate and boracic acid in solution, and giving opium and stimulants for the diarrhœa.

CARBOLIC ACID AND CREOLIN are valuable in 2 per cent. solutions for intra-uterine douches and to cleanse metal instruments. Glycerine should be added to carbolic solutions to insure solu-

bility. Creolin forms a ready emulsion with water. In 30 drops to the pint of warm water it makes an excellent vesical douche in cystitis. Its odor is disagreeable to many; it stains linen and white rubber articles; it is very irritating to the skin of some patients. Severe pain is sometimes complained of after the use of creolin solutions 2 per cent., but inflammation rarely follows in these cases.

Carbolic acid and creolin cause smoky urine in cases of poisoning, with dysuria and toxæmia, terminating in coma and death. Aside from stopping the use of the poisonous substance, but little can be done in treating these cases.

Boracic acid is an excellent antiseptic for use on the mother's nipple, in the child's mouth and eyes, and in 60-grain suppositories within the uterus. Saturated solutions may be used, with the addition of ʒ½ of glycerine to the ℥. In powder, boracic acid is useful as a dressing for the umbilicus, and in dusting the folds of the skin in children disposed to eczema.

Thymol, 1 to 1,000, is an excellent intra-uterine douche.

Iodoform may be used in suppositories within the uterus in the following formula:

Iodoform	grs. 300
Gum Arabic.	
Glycerine	
Starch	āā gr. 30

In 3 suppositories, or the quantity of iodoform may be grs. 180, each suppository containing 60 grains.

Iodoform may be used to dust the umbilicus and cord; it may be combined with bismuth subnitrate, equal parts.

Dressings for the Umbilical Cord.—Powdered salicylic acid, 1 part; powdered starch, 5 parts; powdered boracic acid; iodoform and bismuth equal parts.

A mass of absorbent cotton large enough to receive the cord and cover it, is sprinkled freely with one of the above powders; the cord is enfolded in the cotton, turned upwards and to the left of the umbilicus and the belly-band pinned over it.

The following OINTMENT will be found useful in healing SORE NIPPLES:

Powdered boracic acid . . . . . grs. 10
Cold cream . . . . . ℥i

Or

Powdered boracic acid . . . . . grs. 10
Lanolin
Cosmoline . . . . . āā ℥½

Or powdered zinc oxide or bismuth subnitrate in the same proportion, with these bases.

DIRECTION FOR MAKING A BREAST-BINDER OR COMPRESSION BANDAGE.—It is twenty-nine inches long by eight wide; three and a half inches from either extremity, and in the centre of the bandage two holes have been cut the size of a quarter of a dollar, the edges of which are carefully overseamed to prevent the apertures from tearing out, the distance between them being the distance measured between the nipples. At the upper edge of the bandage, five inches from the end, two shoulder-straps are attached, two inches wide. The bandage is so applied that it pins over the centre of the chest between the breasts, the apertures giving room for the nipples, through which the child may nurse. The shoulder-straps come over the shoulders and may cross in front, or be pinned without crossing, to the upper edge of the bandage after it has been fastened about the body. The purpose of this bandage is to draw the breasts upward and inward, thus relieving the pain caused by engorgement. This bandage may be made of Canton flannel or of firm muslin as desired.

THE ABDOMINAL BINDER.—A strip of hemmed muslin 12 inches wide, from 24 to 30 inches long.

LAXATIVES.—For use during pregnancy the compound licorice powder is excellent; also the compound rhubarb pill of the U. S. P. Women threatened with eclampsia do well with the compound colocynth pill.

After labor Fordyce Barker's post partum pill is useful:

Ext. colŏcynth comp.	gr. 20
Ext. hyoscyam.	gr. 15
Pulv. aloes socot.	gr. 10
Ext. nucis vom.	gr. 5
Podophyllin	
Ipecacuanha . . . . . āā	gr. 1

In 12 pills. Two may be taken at a dose.

If the tongue be furred and coated, calomel, grs. 2½, and sodium bicarbonate, gr. 10, may be taken, followed in eight or ten hours by a seidlitz powder and a copious rectal injection.

Anæsthetics are to be chosen in obstetric cases as follows:—

Chloroform, in normal labor as an anodyne until the moment of delivery, when complete anæsthesia is desired. In threatened uterine rupture, where uterine tetanus is present, chloroform to complete anæsthesia is indicated. To relax a tightly contracted uterus to permit the removal of a retained placenta, chloroform is indicated; for the low forceps operation and for version.

Ether is to be preferred for Cæsarean section; amputation of the uterus; craniotomy; the high forceps application; for suturing the perineum.

Bromide of ethyl and the alcohol, chloroform and ether mixture, alcohol 1, chloroform 2, ether 3, have been used, but possesses no practical advantages over ether and chloroform.

The Diagnosis of Contracted Pelvis.—The following measurements are to be made:

Between the ant. sup. spines of the ilia.

Between the crests of the ilia.

The external conjugate, from beneath the spine of the last lumbar vertebra to the pubic joint, anterior aspect.

The internal, true conjugate, from the sacral promontory to the posterior surface of the pubic joint.

Between the tuberosities of the ischia.

From the post. sup. spine of the ilium of one side to the ant. sup. spine of the other.

The following clinical data are given by Dührssen, as indicating the presence of pelvic deformity:

Small stature.

Curved and prominent extremities.

Pendulous abdomen during a first pregnancy.

History of previous difficult labor.

Complicated labor.

Premature rupture of the membranes.

Prolapse of the cord or fœtal limbs.

Failure of the head to enter the pelvis.

Abnormal position and presentation of the child.

The various presentations of the head in contracted pelves are: In flat pelvis, the anterior fontanelle sinks deeply, a parietal bone presenting; in symmetrically-contracted pelves, the posterior fontanelle and vertex sink deeply; in flat, rhachitic pelves, presentation of parietal bone and deep position of the smaller fontanelle. These various positions are those most favorable in the respective kinds of contracted pelves.

Contents of Baby Basket.—This basket should include the baby's toilet articles: simple rice powder, a little pot of white vaseline or cold cream, white Castile or spermaceti soap, and such other articles as an experienced nurse or mother may deem necessary. We append a list of an outfit which has been found of practical use: brush and comb; skein of white twisted embroidery silk; soft fine sponge; bottle of white vaseline; sharp pair of pointed scissors; powder-box and puff, with talc powder; pin-cushion; small and large safety-pins; pure castile soap; pair of socks; some old, fine linen; flannel or knitted band; flannel shirt, a petticoat and night-gown for infant; an afghan or piece of extra flannel, in which to wrap child; also piece of flannel, or old blanket, to receive it in; in addition the baby will require eight day dresses, eight night gowns, eight white skirts, four day flannel skirts, four night flannel skirts, four pairs of day socks, four pairs of night socks, six flannel shirts, six flannel bands, three dozen small soft linen diapers, three dozen larger cotton ones, at least two little knitted sacques.

The following description of A CROCHETTED BABY-BAND is taken from "Babyhood," Vol. III., p. 33: "Single zephyr in ridge stitch; that is, half stitch, in which, going back and forth, only the back half of the stitches in the lower row are picked up. Begin on a chain of fifty and crochet forty-eight ridges, hence ninety-six rows. Join by a row of plain stitches, and at top by a picot edging (five chains and a tight stitch back into the first)."

INFANTILE COLIC.—Prevented by proper diet of mother and systematic nursing of infant.

Relieved by peppermint water, gtt. x–xv, in a little sweetened hot water. If constipation exists, it can usually be relieved by Sodii Phosphas, gr. v–x, three times daily, given in hot water.

A spice plaster, or hot flannel over the abdomen, is also useful.

INDEX.

	Page
ABDOMINAL binder	286
Abnormal condition of mother's milk	214
Abnormal insertion of the placenta	222
Abnormal labor, treatment of, in head-presentation	88
Abnormalities of labor in head-presentations	71
Abnormalities of the umbilical cord	270
Abortion	149
Abortion, criminal	155
Abortion, habit of	151
Abortion, therapeutic	155
Accidents of labor endangering the mother	238
Acid, boracic	285
Acid, carbolic	284
Acute infections during pregnancy	175
Adherence of the placenta and membranes	267
Adherent placenta	154
Adhesion of the amnion	269
Affections of the genito-urinary organs during pregnancy	179
After birth	18
Allantois	16
Amnial liquid	16
Amnion	15
Amnion, adhesion of	269
Amputation of the pregnant uterus	192
Anæmia of pregnancy	54
Anæsthesia during labor	79
Anæsthetics	287
Anterior displacement of the pregnant uterus	181
Anterior fontanelle	30
Antisepsis in labor	87
Antiseptics	284
Appendages, fœtal, disorders of	269
Application of the forceps	94
Area germinativa	14
Artificial feeding of infants	217
Asphyxia	279
Asphyxiated child, resuscitation of	114
Attitude of the fœtus	57
Auto-transfusion	227
Axial groove	14
Axis of the birth-canal	38
Axis-traction	98
BABY-BASKET, contents of	288
Bandage, compression	286
Bandl, contraction-ring of	238
Basket, baby, contents of	288
Binder, abdominal	286
Binder, breast	286
Birth, fœtus at	29
Birth-canal	34
Birth-canal, axis of	38
Birth-canal, disproportion between the child and	132
Blastodermic vesicle	13
Blood of the new-born child	282
Blood, the mother's, during pregnancy	184
Blood-system, fœtal	21
Bony pelvis, diameters of	34
Boracic acid	285
Braxton-Hicks, method of version of	124
Breast, engorgement of	261
Breast-binder	286
Breasts, care of during the puerperium	212
Breech-presentation, first	109
Breech-presentation, forceps in	107
Breech-presentation, labor in	109
Breech-presentations, morbidity and mortality of	119
Breech-presentations, treatment of	111
Bregma	30

	Page
Brim, pelvic	35
Brow-presentation	72
Brow-presentation, treatment of	90
CÆSAREAN SECTION	188
Canal, neural	14
Caput succedaneum	66
Carbolic acid	284
Carcinoma complicating labor	136
Cardiac disorders during pregnancy	177
Care of the breasts during the puerperium	212
Care of the umbilical cord after labor	87
Central placenta prævia	222
Cephalhæmatoma	282
Cephalotribe	196
Cephalotripsy	199
Cervix uteri, laceration of	243
Changes in the mother occasioned by pregnancy	43
Changes in the nervous system during pregnancy	182
Changes in the ovum after fecundation	12
Checking lactation	263
Child, asphyxiated, resuscitation of	114
Child, delivery of	80
Child, disproportion between, and the birth-canal	132
Child, new-born, diseases of	279
Child, new-born, septic infection in	280
Child, new-born, the blood of	282
Children, ill-developed	273
Chorion	15
Circular sinus	20
Circulation, fœtal	26
Circulation, placental	26
Circulation, vitelline	26
Cleavage	12
Coils of the umbilical cord	270
Colic, infantile	289
Combined version	124
Complicated labor, surgical treatment of	188
Complications of the puerperal state	261
Compression bandage	286
Compression of the fœtal limbs	269
Conception	9
Condition, abnormal, of mother's milk	214
Constitutional treatment of puerperal sepsis	258
Contents of baby-basket	288
Contracted pelvis, diagnosis of	287
Contraction-ring of Bandl	238
Cord, umbilical (see Umbilical Cord)	22
Cotyledons	21
Cranioclasis	198
Craniotomy	194
Credé's method of delivery of the placenta	266
Creolin	284
Criminal abortion	155
DANGERS attending the use of the forceps	193
Death, fœtal, in utero	277
Death, sudden, during labor	248
Decapitation	201
Decidua, ovular	13
Decidua, placental	13
Decidua reflexa	13
Decidua serotina	13
Decidua, uterine	13
Decidua vera	13
Decidual endometritis	269
Deciduous membranes	12
Deficiency of fœtal development	273
Deformed pelvis, labor in	139
Deformities, spinal, complicating labor	146
Degeneration, myxomatous, of the placenta	270
Delayed labor, minor obstetric surgery in	204
Delivery, obstacles to	135
Delivery of the child	80
Delivery of the placenta, Credé's method of	266
Development, excessive, of the fœtus	273
Development, fœtal, deficiency of	273
Diagnosis of contracted pelvis	287
Diagnosis of extra-uterine or ectopic pregnancy	230
Diagnosis of labor	61
Diagnosis of pregnancy	45
Diameters of the bony pelvis	34
Diameters of the fœtal head	31
Diameters of the fœtal trunk	29
Diseases of the new-born child	279
Disinfection of the cavity of the uterus	255
Disorders, cardiac, during pregnancy	177
Disorders of the fœtal appendages	269
Disorders of the fœtus	273
Disorders of the skin during pregnancy	185

Page
Displacement, anterior, of the pregnant uterus 181
Disproportion between the child and the birth-canal 132
Disturbance, emotional, in the puerperal patient 264
Dressings for the umbilical cord . . . 285
Drugs, excretion of, in mother's milk . 216
Duration of pregnancy 60

ECLAMPSIA 166
Eclampsia, treatment of 168
Ectopic pregnancy 11, 45, 228
Embryo 15, 24
Embryology 24
Embryotomy 294
Emotional disturbance in the puerperal patient 264
Endometritis, decidual 269
Engagement of the head in the pelvis . 133
Engorgement of the breast 261
Entopic pregnancy 11
Epiblast 12
Episiotomy 42, 82
Evisceration 203
Excessive development of the fœtus . . 273
Excretion of drugs in mothers' milk . . 216
Expulsion of the placenta 83
External version 124
Extra-uterine pregnancy 11, 45, 228
Extra-uterine pregnancy, diagnosis of . 230

FACE-PRESENTATION 72
Face-presentation, first 74
Face-presentation, forceps in 107
Face-presentation, mechanism of labor in 74
Face-presentation, treatment of 90
Fæcal toxæmia 264
Fallopian tubes 11
Fecundation, changes in the ovum after, 12
Feeding, artificial, of infants 217
Fever, puerperal 251
Fibroids complicating labor 135
First breech-presentation 109
First face-presentation 74
First position 66
First stage of labor 61
First stage of labor, treatment of . . . 77
Fissure of the nipples 263
Flat pelvis, simple 140

Page
Floor, pelvic 40
Fœtal appendages, disorders of 269
Fœtal blood-system 21
Fœtal body, Tumors of 274
Fœtal circulation 26
Fœtal limbs, compression of 269
Fœtal death in utero 277
Fœtal development, deficiency of . . . 273
Fœtal head 30
Fœtal trunk 29
Fœtus 24
Fœtus at birth 29
Fœtus, attitude and location of 57
Fœtus, disorders of 273
Fœtus, excessive development of . . . 273
Fœtus, hydrocephalus in 274
Fœtus, impaction of, in labor 76
Fœtus, macerated 278
Fœtus, mummified 278
Fœtus, nourishment of 26
Fœtus, position of 57
Fœtus, presentation of 57
Fœtus, rhachitis of 283
Fœtus, syphilis of 282
Fontanelle, anterior 30
Fontanelle, posterior 30
Footling case 113
Forceps 91
Forceps, application of 94
Forceps, axis-traction 98
Forceps, dangers attending the use of . 93
Forceps in breech-presentations 107
Forceps in face-presentations 107
Forceps in posterior rotation of the occiput 106
Forceps, indications for the use of . . . 92
Forceps, morbidity and mortality caused by 107
Forceps operation, high 103
Forceps, traction with 95
Fronto-anterior position 72
Fronto-anterior position, left 74
Funnel-shaped pelvis 147

GENITO-URINARY organs, affections of, during pregnancy 179
Groove, axial or medullary 14

HABIT of abortion 15
Hæmorrhage from the umbilicus 282
Hæmorrhage, post-partum 233
Hæmorrhage, uterine 9

	Page
Head, engagement of, in the pelvis	133
Head, fœtal	30
Head, impaction of, in labor	72
Head-presentations, abnormalities of labor in	71
Head-presentations, mechanism of labor in	62
Head-presentations, treatment of abnormal labor in	88
Hegar's sign of pregnancy	52
Hernia of the pregnant uterus	186
High forceps operation	103
Hydrocephalus in the fœtus	274
Hygiene of pregnancy	53
Hypoblast	12
ILL-DEVELOPED children	273
Impaction of the fœtus in labor	76
Impaction of the head in labor	72
Impregnation	11
Indications for the use of the forceps	92
Induced labor	157
Infantile colic	289
Infantile pelvis	147
Infants, artificial feeding of	217
Infections, acute, during pregnancy	175
Injuries to the pelvic floor	41
Insanity during pregnancy	183
Insertion, abnormal, of the placenta	222
Internal version	124
Interstitial pregnancy	230
Intra-uterine pregnancy	11
Inversion of the uterus	242
Involution	206
Iodoform	285
JAUNDICE during pregnancy	185
Jelly, Wharton's	22
Joints, pelvic, relaxation of, during pregnancy	182
Justo-major pelvis	139
Justo-minor pelvis	139
LABOR	61
Labor, abnormal, treatment of, in head-presentation	88
Labor, abnormalities of, in head-presentations	71
Labor, accidents of, endangering the mother	238
Labor, anæsthesia during	79
Labor, antisepsis in	87
Labor, carcinoma complicating	136
Labor, care of the umbilical cord after	87
Labor, complicated, surgical treatment of	188
Labor, delayed, minor obstetric surgery in	204
Labor, diagnosis of	61
Labor, fibroids complicating	135
Labor, first stage of	61
Labor, impaction of the fœtus in	76
Labor, impaction of the head in	72
Labor in breech-presentation	109
Labor in deformed pelvis	139
Labor, induced	157
Labor in multiple pregnancies	163
Labor in symmetrically-large pelves	139
Labor in symmetrically-small pelves	139
Labor in transverse positions	120
Labor, malformations complicating	137
Labor, mechanism of, in face-presentations	74
Labor, mechanism of, in head-presentations	62
Labor, ovarian cysts complicating	137
Labor, premature	149
Labor, rupture of the pubic joint during	249
Labor, second stage of	69
Labor, spinal deformities complicating	146
Labor, sudden death during	248
Labor, support of the perineum in	80
Labor, third stage of	83
Labor, thrombosis of the veins about the vulva and vagina during	249
Labor, treatment of the first stage of	77
Laceration of the cervix uteri	243
Laceration of the pelvic floor	85
Laceration of the perineum and pelvic floor	245
Lactation	212
Lactation, checking	263
Large pelves, symmetrically, labor in	139
Lateral placenta prævia	223
Laxatives	286
Left fronto-anterior position	74
Left occipito-anterior position	66
Litigation of the umbilical cord	81
Limbs, fœtal, compression of	269
Liquor amnii	16
Lithopædion	278
Location of the fœtus	57
Lying-in period	206

Page

MACERATED fœtus 278
Malformations complicating labor 137
Marginal placenta prævia 222
Mask of pregnancy 185
Mastitis 262
Measurements, pelvic 46
Mechanism of labor in face-presentation 74
Mechanism of labor in head-presentations 62
Meconium 29
Medullary groove 14
Membrane, vitelline 18
Membrane, yelk 15
Membranes, deciduous 12
Membranes, placenta and, adherence of 267
Menstruation. 9
Mento-anterior position 72
Mento-posterior position, right 74
Mesoblast 13
Milk, mothers', abnormal condition of . 204
Milk, mothers', excretion of drugs in . 216
Milk, mothers', substitutes for 218
Milk, sterilization of 219
Minor obstetric surgery in delayed labor 204
Miscarriage 149
Mole, vesicular 270
Monsters 277
Morbidity and mortality caused by the forceps 107
Morbidity and mortality of breech-presentations 119
Mother, accidents of labor endangering 238
Mother-cake 18
Mother in pregnancy 43
Mother's blood during pregnancy . . . 184
Mothers' milk, abnormal condition of . 214
Mothers' milk, excretion of drugs in . . 216
Mothers' milk, substitutes for 218
Multiple pregnancy 161
Multiple pregnancy, labor in 163
Mummified fœtus 278
Muriform body 12
Myxomatous degeneration of the placenta 270

NAUSEA and vomiting of pregnancy 53
Nephritis during pregnancy . . . 173
Nervous system, changes in, during pregnancy 182
Neural canal 14
New-born child, diseases of 279
New-born child, septic infection in . . 280
New-born child, the blood of 282
Nipples, fissure of 263
Nipples, sore 286
Nodes of the umbilical cord 23
Normal pregnancy 11
Nourishment of the fœtus 26

OBLIQUELY-CONTRACTED pelvis 147
Obstacles to delivery 135
Obstetric surgery, minor, in delayed labor 204
Obstetric trephines 197
Occipito-anterior position, left 66
Occipito posterior position 71
Occipito-sacral position, treatment of . 90
Occiput, posterior rotation of, forceps in . . . . . .
Operation, high forceps 103
Ophthalmia neonatorum 280
Osteomalacic pelvis 147
Osteoporosis 148
Osteosclerosis 148
Outlet, pelvic 37
Ova 10
Ovarian cysts complicating labor . . . 137
Ovarian pregnancy 230
Ovaries 10
Oviducts. 11
Ovum, changes in the, after fecundation 12
Ovular decidua 13
Ovulation 9

PARAMETRITIS 254
Parietal-bone presentation 72
Partial placenta prævia 222
Pathology of pregnancy 166
Pelves, deformed labor in, ... 139
Pelves, symmetrically small, labor in . 139
Pelvic brim 35
Pelvic floor 40
Pelvic floor, injuries to 41
Pelvic floor, laceration of 85
Pelvic floor, laceration of the perineum and 245
Pelvic joints, relaxation of, during pregnancy 182
Pelvic measurements 46
Pelvic outlet 37

	Page
Pelvimeter	51
Pelvis, contracted, diagnosis of	287
Pelvis, engagement of the head in	133
Pelvis, funnel-shaped	147
Pelvis, infantile	147
Pelvis justo-major	139
Pelvis justo-minor	139
Pelvis, obliquely-contracted	147
Pelvis, osteo-malacic	147
Pelvis, pregnancy complicated by foreign growths in the uterus and	187
Pelvis, rhachitic	143
Pelvis, simple flat	140
Pelvis, symmetrically-large, labor in	139
Pelvis, symmetrically-small, labor in	139
Perimetritis	254
Perineum and pelvic floor, laceration of	245
Perineum, support of, in labor	80
Period, lying-in	206
Pernicious vomiting of pregnancy	184
Placenta	16, 18
Placenta, abnormal insertion of	222
Placenta, adherent	154
Placenta and membranes, adherence of	267
Placenta, delivery of, Credé's method of	266
Placenta, expulsion of	83
Placenta, myxomatous degeneration of	270
Placenta prævia	222
centralis	222
lateralis	222
marginalis	222
partialis	222
Placenta, retention of	267
Placenta succenturiata	22
Placenta, syphilis of	270
Placental circulation	26
Placental decidua	13
Polyhydramnios	269
Position, first or left occipito-anterior	66
Position, fronto-anterior	72
Position, left fronto-anterior	74
Position, mento-anterior	72
Position, occipito-posterior	71
Position of the fœtus	57
Position, right mento-posterior	74
Posterior fontanelle	30
Posterior rotation of the occiput, forceps in	106
Post-partum hæmorrhage	233
Pregnancy	10
Pregnancy, acute infections during	175
Pregnancy, affections of the genito-urinary organs during	179
Pregnancy, anæmia of	54
Pregnancy, cardiac disorders during	177
Pregnancy, changes in the nervous system during	182
Pregnancy complicated by foreign growths in the uterus and pelvis	187
Pregnancy, diagnosis of	45
Pregnancy, disorders of the skin during	185
Pregnancy, duration of	60
Pregnancy, ectopic	11, 45, 228
Pregnancy, ectopic, diagnosis of	230
Pregnancy, entopic	11
Pregnancy, extra-uterine	11, 45, 228
Pregnancy, extra-uterine, diagnosis of	230
Pregnancy, Hegar's sign of	52
Pregnancy, hygiene of	53
Pregnancy, insanity during	183
Pregnancy, interstitial	230
Pregnancy, intra-uterine	11
Pregnancy, jaundice during	185
Pregnancy, mask of	185
Pregnancy, mother in	43
Pregnancy, mother's blood during	184
Pregnancy, multiple	161
Pregnancy, nausea and vomiting of	53
Pregnancy, nephritis during	173
Pregnancy, normal	11
Pregnancy, ovarian	230
Pregnancy, pathology of	166
Pregnancy, pernicious vomiting of	184
Pregnancy, relaxation of the pelvic joints during	182
Pregnancy, tubal	228
Pregnancy, varicose veins during	186
Pregnant uterus, amputation of	192
Pregnant uterus, anterior displacement of	181
Pregnant uterus, hernia of	186
Pregnant uterus, retro-displacement of	180
Premature labor	149
Presentation, brow	72
Presentation, face	72
Presentation of the fœtus	57
Presentation, parietal-bone	72
Prolapse of the umbilical cord	271
Pubic joint, rupture of, during labor	249
Puerperal fever	251
Puerperal patient, emotional distance in	264
Puerperal sepsis	251

Page

Puerperal sepsis, constitutional treatment of 258
Puerperal sepsis, surgical treatment of . 260
Puerperal state, complications of . . . 261
Puerperium 206
Puerperium, care of the breasts during. 212

RELAXATION of the pelvic joints during pregnancy 182
Resuscitation of an asphyxiated child . 114
Retention of the placenta 266
Retro-displacement of the pregnant uterus 180
Rhachitic pelvis 143
Rhachitis of the fœtus 283
Right mento-posterior position 74
Rotation 67
Rotation of the occiput, posterior, forceps in 106
Rupture of the pubic joint during labor. 249
Rupture of the uterus 238

SECOND stage of labor 69
Section, Cæsarean 188
Segmentation 12
Selection of a wet-nurse 217
Sepsis, puerperal 251
Septic infection in the new-born child . 280
Simple flat pelvis 140
Sinus, circular 20
Skin, disorders of, during pregnancy . 185
Small pelvis, symmetrically, labor in . 139
Sore nipples 286
Spermatozoid 11
Spinal deformities complicating labor . 146
Stage of labor, first 61
Stage of labor, second 69
Stage of labor, third 83
Sterilization of milk 219
Strait, superior 35
Subinvolution 263
Substitutes for mothers' milk 218
Sudden death during labor 248
Superfecundation 161
Superfœtation 161
Superior strait 35
Support of the perineum in labor . . . 80
Surgery, minor obstetric, in delayed labor 204
Surgical treatment of complicated labor 189
Surgical treatment of puerperal sepsis . 260

Page

Sutures of the fœtal head 30
Symmetrically-large pelves, labor in . . 139
Symmetrically small pelves, labor in . . 139
Syphilis of the fœtus 282
Syphilis of the placenta 270

THERAPEUTIC abortion 155
Third stage of labor 83
Thrombosis of the veins about the vulva and vagina during labor 249
Thymol 285
Toxæmia, fæcal 264
Traction with the forceps 95
Transverse positions, labor in 120
Transverse positions, treatment of . . . 123
Treatment, constitutional, of puerperal sepsis 258
Treatment of abnormal labor in head-presentation 88
Treatment of breech-presentations . . 111
Treatment of brow-presentation . . . 90
Treatment of eclampsia 168
Treatment of face-presentation 90
Treatment of occipito-sacral position . 90
Treatment of the first stage of labor . 77
Treatment of transverse positions . . . 123
Treatment, surgical, of puerperal sepsis 260
Trephines, obstetric 197
Trunk, fœtal 29
Tubal pregnancy 228
Tubes, Fallopian 11
Tumors of the fœtal body 274
Twins 162

UMBILICAL cord 22
Umbilical cord, abnormalities of 270
Umbilical cord, care of, after labor . . 87
Umbilical cord, coils of 290
Umbilical cord, dressings for 285
Umbilical cord, ligation of 81
Umbilical cord, nodes of 23
Umbilical cord, prolapse of 271
Umbilical cord, velamentous insertion of 23
Umbilical vesicle 15
Umbilicus, hæmorrhage from 282
Uterine decidua 13
Uterine hæmorrhage 9
Uterus and pelvis, pregnancy complicated by foreign growths in 187
Uterus, disinfection of the cavity of . . 255
Uterus, inversion of 242

Page
Uterus, pregnant, amputation of 192
Uterus, pregnant, anterior displacement of 181
Uterus, pregnant hernia of 186
Uterus, pregnant, retro-displacement of 180
Uterus, rupture of 238

VAGINA, vulva and, thrombosis of the veins of, during labor 249
Vaginitis 253
Varicose veins during pregnancy 186
Veins about the vulva and vagina, thrombosis of, during labor 249
Veins, varicose, during pregnancy . . . 186
Velamentous insertion of the umbilical cord 23
Version 123
Version, combined 124
Version, external 124
Version, internal 124
Version, method of, of Braxton-Hicks . 124
Vesicle, blastodermic 13
Vesicle, umbilical 15
Vesicular mole 270
Villi 18
Vitelline circulation 26
Vitelline membrane 18
Vomiting of pregnancy 53
Vomiting, pernicious, of pregnancy . . 184
Vulva and vagina, thrombosis of the veins about, during labor 249
Vulvitis 253

WET-NURSE, selection of 217
Wharton's jelly 22

YELK MEMBRANE 15

ZONA PELLUCIDA 18

A CATALOGUE

OF

BOOKS FOR STUDENTS.

INCLUDING THE

? QUIZ-COMPENDS ?

CONTENTS.

	PAGE
New Series of Manuals,	2,3,4,5
Anatomy,	6
Biology,	11
Chemistry,	6
Children's Diseases,	7
Dentistry,	8
Dictionaries,	8
Eye Diseases,	9
Electricity,	9
Gynæcology,	10
Hygiene,	9
Materia Medica,	9
Medical Jurisprudence,	10
Obstetrics.	10
Pathology, Histology,	11
Pharmacy,	12
Physical Diagnosis,	11
Physiology,	11
Practice of Medicine,	11, 12
Prescription Books,	12
? Quiz-Compends ?	14, 15
Skin Diseases,	12
Surgery,	13
Therapeutics,	9
Urine and Urinary Organs,	13
Venereal Diseases,	13

PUBLISHED BY

P. BLAKISTON, SON & CO.,

Medical Booksellers, Importers and Publishers.

LARGE STOCK OF ALL STUDENTS' BOOKS, AT THE LOWEST PRICES.

1012 Walnut Street, Philadelphia.

*** For sale by all Booksellers, or any book will be sent by mail, postpaid, upon receipt of price. Catalogues of books on all branches of Medicine, Dentistry, Pharmacy, etc., supplied upon application.

☞ Gould's New Medical Dictionary Just Ready. *See page 10.*

"An excellent Series of Manuals."—*Archives of Gynæcology.*

A NEW SERIES OF
STUDENTS' MANUALS

On the various Branches of Medicine and Surgery.

Can be used by Students of any College.

Price of each, Handsome Cloth, $3.00. Full Leather, $3.50.

The object of this series is to furnish good manuals for the medical student, that will strike the medium between the compend on one hand and the prolix text-book on the other—to contain all that is necessary for the student, without embarrassing him with a flood of theory and involved statements. They have been prepared by well-known men, who have had large experience as teachers and writers, and who are, therefore, well informed as to the needs of the student.

Their mechanical execution is of the best—good type and paper, handsomely illustrated whenever illustrations are of use, and strongly bound in uniform style.

Each book is sold separately at a remarkably low price, and the immediate success of several of the volumes shows that the series has met with popular favor.

No. 1. SURGERY. 236 Illustrations.

A Manual of the Practice of Surgery. By WM. J. WALSHAM, M.D., Asst. Surg. to, and Demonstrator of Surg. in, St. Bartholomew's Hospital, London, etc. 236 Illustrations.

Presents the introductory facts in Surgery in clear, precise language, and contains all the latest advances in Pathology, Antiseptics, etc.

"It aims to occupy a position midway between the pretentious manual and the cumbersome System of Surgery, and its general character may be summed up in one word—practical."—*The Medical Bulletin.*

"Walsham, besides being an excellent surgeon, is a teacher in its best sense, and having had very great experience in the preparation of candidates for examination, and their subsequent professional career, may be relied upon to have carried out his work successfully. Without following out in detail his arrangement, which is excellent, we can at once say that his book is an embodiment of modern ideas neatly strung together, with an amount of careful organization well suited to the candidate, and, indeed, to the practitioner."—*British Medical Journal.*

Price of each Book, Cloth, $3.00; Leather, $3.50.

No. 2. DISEASES OF WOMEN. 150 Illus.
NEW EDITION.

The Diseases of Women. Including Diseases of the Bladder and Urethra. By DR. F. WINCKEL, Professor of Gynæcology and Director of the Royal University Clinic for Women, in Munich. Second Edition. Revised and Edited by **Theophilus Parvin**, M.D., Professor of Obstetrics and Diseases of Women and Children in Jefferson Medical College. 150 Engravings, most of which are original.

"The book will be a valuable one to physicians, and a safe and satisfactory one to put into the hands of students. It is issued in a neat and attractive form, and at a very reasonable price."—*Boston Medical and Surgical Journal.*

No. 3. OBSTETRICS. 227 Illustrations.

A Manual of Midwifery. By ALFRED LEWIS GALABIN, M.A., M.D., Obstetric Physician and Lecturer on Midwifery and the Diseases of Women at Guy's Hospital, London; Examiner in Midwifery to the Conjoint Examining Board of England, etc. With 227 Illus.

"This manual is one we can strongly recommend to all who desire to study the science as well as the practice of midwifery. Students at the present time not only are expected to know the principles of diagnosis, and the treatment of the various emergencies and complications that occur in the practice of midwifery, but find that the tendency is for examiners to ask more questions relating to the science of the subject than was the custom a few years ago. * * * The general standard of the manual is high; and wherever the science and practice of midwifery are well taught it will be regarded as one of the most important text-books on the subject."—*London Practitioner.*

No. 4. PHYSIOLOGY. Fifth Edition.
321 ILLUSTRATIONS AND A GLOSSARY.

A Manual of Physiology. By GERALD F. YEO, M.D., F.R.C.S., Professor of Physiology in King's College, London. 321 Illustrations and a Glossary of Terms. Fifth American from last English Edition, revised and improved. 758 pages.

This volume was specially prepared to furnish students with a new text-book of Physiology, elementary so far as to avoid theories which have not borne the test of time and such details of methods as are unnecessary for students in our medical colleges.

"The brief examination I have given it was so favorable that I placed it in the list of text-books recommended in the circular of the University Medical College."—*Prof. Lewis A. Stimson*, M.D., *37 East 33d Street, New York.*

Price of each Book, Cloth, $3.00; Leather, $3.50.

No. 5. DISEASES OF CHILDREN.

SECOND EDITION.

A Manual. By J. F. GOODHART, M.D., Phys. to the Evelina Hospital for Children; Asst. Phys. to Guy's Hospital, London. Second American Edition. Edited and Rearranged by LOUIS STARR, M.D., Clinical Prof. of Dis. of Children in the Hospital of the Univ. of Pennsylvania, and Physician to the Children's Hospital, Phila. Containing many new Prescriptions, a list of over 50 Formulæ, conforming to the U. S. Pharmacopœia, and Directions for making Artificial Human Milk, for the Artificial Digestion of Milk, etc. Illus.

"The merits of the book are many. Aside from the praiseworthy work of the printer and binder, which gives us a print and page that delights the eye, there is the added charm of a style of writing that is not wearisome, that makes its statements clearly and forcibly, and that knows when to stop when it has said enough. The insertion of typical temperature charts certainly enhances the value of the book. It is rare, too, to find in any text-book so many topics treated of. All the rarer and out-of-the-way diseases are given consideration. This we commend. It makes the work valuable."—*Archives of Pedriatics, July, 1890.*

"The author has avoided the not uncommon error of writing a book on general medicine and labeling it 'Diseases of Children,' but has steadily kept in view the diseases which seemed to be incidental to childhood, or such points in disease as appear to be so peculiar to or pronounced in children as to justify insistence upon them. * * * A safe and reliable guide, and in many ways admirably adapted to the wants of the student and practitioner."—*American Journal of Medical Science.*

"Thoroughly individual, original and earnest, the work evidently of a close observer and an independent thinker, this book, though small, as a handbook or compendium is by no means made up of bare outlines or standard facts."—*The Therapeutic Gazette.*

"As it is said of some men, so it might be said of some books, that they are 'born to greatness.' This new volume has, we believe, a mission, particularly in the hands of the younger members of the profession. In these days of prolixity in medical literature, it is refreshing to meet with an author who knows both what to say and when he has said it. The work of Dr. Goodhart (admirably conformed, by Dr. Starr, to meet American requirements) is the nearest approach to clinical teaching without the actual presence of clinical material that we have yet seen."—*New York Medical Record.*

Price of each Book, Cloth, $3.00: Leather, $3.50.

No. 6. PRACTICAL THERAPEUTICS.

FOURTH EDITION, WITH AN INDEX OF DISEASES.

Practical Therapeutics, considered with reference to Articles of the Materia Medica. Containing, also, an Index of Diseases, with a list of the Medicines applicable as Remedies. By EDWARD JOHN WARING, M.D., F.R.C.P. Fourth Edition. Rewritten and Revised by DUDLEY W. BUXTON, M.D., Asst. to the Prof. of Medicine at University College Hospital.

"We wish a copy could be put in the hands of every Student or Practitioner in the country. In our estimation, it is the best book of the kind ever written."—*N. Y. Medical Journal.*

"Dr. Waring's Therapeutics has long been known as one of the most thorough and valuable of medical works. The amount of actual intellectual labor it represents is immense. . . . An index of diseases, with the remedies appropriate for their treatment, closes the volume."—*Boston Medical and Surgical Reporter.*

"The plan of this work is an admirable one, and one well calculated to meet the wants of busy practitioners. There is a remarkable amount of information, accompanied with judicious comments, imparted in a concise yet agreeable style."—*Medical Record.*

No. 7. MEDICAL JURISPRUDENCE AND TOXICOLOGY.

THIRD REVISED EDITION.

By JOHN J. REESE, M.D., Professor of Medical Jurisprudence and Toxicology in the University of Pennsylvania; President of the Medical Jurisprudence Society of Phila.; Third Edition, Revised and Enlarged.

"This admirable text-book."—*Amer. Jour. of Med. Sciences.*

"We lay this volume aside, after a careful perusal of its pages, with the profound impression that it should be in the hands of every doctor and lawyer. It fully meets the wants of all students. . . . . He has succeeded in admirably condensing into a handy volume all the essential points."—*Cincinnati Lancet and Clinic.*

"The book before us will, we think, be found to answer the expectations of the student or practitioner seeking a manual of jurisprudence, and the call for a second edition is a flattering testimony to the value of the author's present effort. The medical portion of this volume seems to be uniformly excellent, leaving little for adverse criticism. The information on the subject matter treated has been carefully compiled, in accordance with recent knowledge. The toxicological portion appears specially excellent. Of that portion of the work treating of the legal relations of the practitioner and medical witness, we can express a generally favorable verdict."—*Physician and Surgeon, Ann Arbor, Mich.*

Price of each Book, Cloth, $3,00; Leather, $3.50.

ANATOMY.

Macalister's Human Anatomy. 816 Illustrations. A new Text-book for Students and Practitioners, Systematic and Topographical, including the Embryology, Histology and Morphology of Man. With special reference to the requirements of Practical Surgery and Medicine. With 816 Illustrations, 200 of which are original. Octavo. Cloth, 7.50; Leather, 8.50

Ballou's Veterinary Anatomy and Physiology. Illustrated. By Wm. R. Ballou, M.D., Professor of Equine Anatomy at New York College of Veterinary Surgeons. 25 graphic Illustrations. 12mo. Cloth, 1.00; Interleaved for notes, 1.25

Holden's Anatomy. A manual of Dissection of the Human Body. Fifth Edition. Enlarged, with Marginal References and over 200 Illustrations. Octavo.

Bound in Oilcloth, for the Dissecting Room, $4.50.

"No student of Anatomy can take up this book without being pleased and instructed. Its Diagrams are original, striking and suggestive, giving more at a glance than pages of text description. * * * The text matches the Illustrations in directness of practical application and clearness of detail."—*New York Medical Record.*

Holden's Human Osteology. Comprising a Description of the Bones, with Colored Delineations of the Attachments of the Muscles. The General and Microscopical Structure of Bone and its Development. With Lithographic Plates and Numerous Illustrations. Seventh Edition. 8vo. Cloth, 6.00

Holden's Landmarks, Medical and Surgical. 4th ed. Cl., 1.25

Heath's Practical Anatomy. Sixth London Edition. 24 Colored Plates, and nearly 300 other Illustrations. Cloth, 5.00

Potter's Compend of Anatomy. Fifth Edition. Enlarged. 16 Lithographic Plates. 117 Illustrations. *See Page 14*

Cloth, 1.00; Interleaved for Notes, 1.25

CHEMISTRY.

Bartley's Medical Chemistry. Second Edition. A text-book prepared specially for Medical, Pharmaceutical and Dental Students. With 50 Illustrations, Plate of Absorption Spectra and Glossary of Chemical Terms. Revised and Enlarged. Cloth, 2.50

Trimble. Practical and Analytical Chemistry. A Course in Chemical Analysis, by Henry Trimble, Prof. of Analytical Chemistry in the Phila. College of Pharmacy. Illustrated. Third Edition. 8vo. Cloth, 1.50

☞ *See pages 2 to 5 for list of Students' Manuals.*

Chemistry:—Continued.

Bloxam's Chemistry, Inorganic and Organic, with Experiments. Seventh Edition. Enlarged and Rewritten. 281 Illustrations. Cloth, 4.50; Leather, 5.50

Richter's Inorganic Chemistry. A text-book for Students. Third American, from Fifth German Edition. Translated by Prof. Edgar F. Smith, PH.D. 89 Wood Engravings and Colored Plate of Spectra. Cloth, 2.00

Richter's Organic Chemistry, or Chemistry of the Carbon Compounds. Illustrated. Second Edition. Cloth, 4.50

Symonds. Manual of Chemistry, for the special use of Medical Students. By BRANDRETH SYMONDS, A.M., M.D., Asst. Physician Roosevelt Hospital, Out-Patient Department; Attending Physician Northwestern Dispensary, New York. 12mo. Cloth, 2.00; Interleaved for Notes, 2.40

Leffmann's Compend of Chemistry. Inorganic and Organic. Including Urinary Analysis. Third Edition. Revised. Cloth, 1.00; Interleaved for Notes, 1.25

Leffmann and Beam. Progressive Exercises in Practical Chemistry. 12mo. Illustrated. Cloth, 1.00

Müter. Practical and Analytical Chemistry. Fourth Edition. Revised, to meet the requirements of American Medical Colleges, by Prof. C. C. Hamilton. Illustrated. Cloth, 2.00

Holland. The Urine, Common Poisons, and Milk Analysis, Chemical and Microscopical. For Laboratory Use. Fourth Edition, Enlarged. Illustrated. Cloth, 1.00

Van Nuys. Urine Analysis. Illus. Cloth, 2.00

Wolff's Applied Medical Chemistry. By Lawrence Wolff, M.D., Dem. of Chemistry in Jefferson Medical College. Clo., 1.00

CHILDREN.

Goodhart and Starr. The Diseases of Children. Second Edition. By J. F. Goodhart, M.D., Physician to the Evelina Hospital for Children; Assistant Physician to Guy's Hospital, London. Revised and Edited by Louis Starr, M.D., Clinical Professor of Diseases of Children in the Hospital of the University of Pennsylvania; Physician to the Children's Hospital, Philadelphia. Containing many Prescriptions and Formulæ, conforming to the U. S. Pharmacopœia, Directions for making Artificial Human Milk, for the Artificial Digestion of Milk, etc. Illustrated. Cloth, 3.00; Leather, 3.50

Hatfield. Diseases of Children. By M. P. Hatfield, M.D., Professor of Diseases of Children, Chicago Medical College. Colored Plate. 12mo. Cloth, 1.00; Interleaved, 1.25

☞ *See pages 14 and 15 for list of Quiz-Compends!*

Children:—Continued.

Starr. Diseases of the Digestive Organs in Infancy and Childhood. With chapters on the Investigation of Disease, and on the General Management of Children. By Louis Starr, M.D., Clinical Professor of Diseases of Children in the University of Pennsylvania. Illus. Second Edition. Cloth, 2.25

DENTISTRY.

Fillebrown. Operative Dentistry. 330 Illus. Cloth, 2.50

Flagg's Plastics and Plastic Filling. 4th Ed. Cloth, 4.00

Gorgas. Dental Medicine. A Manual of Materia Medica and Therapeutics. Fourth Edition. Cloth, 3.50

Harris. Principles and Practice of Dentistry. Including Anatomy, Physiology, Pathology, Therapeutics, Dental Surgery and Mechanism. Twelfth Edition. Revised and enlarged by Professor Gorgas. 1028 Illustrations. Cloth, 7.00; Leather, 8.00

Richardson's Mechanical Dentistry. Fifth Edition. 569 Illustrations. 8vo. Cloth, 4.50; Leather, 5.50

Sewill. Dental Surgery. 200 Illustrations. 3d Ed. Clo., 3.00

Taft's Operative Dentistry. Dental Students and Practitioners. Fourth Edition. 100 Illustrations. Cloth, 4.25; Leather, 5.00

Talbot. Irregularities of the Teeth, and their Treatment. Illustrated. 8vo. Second Edition. Cloth, 3.00

Tomes' Dental Anatomy. Third Ed. 191 Illus. Cloth, 4.00

Tomes' Dental Surgery. 3d Edition. Revised. 292 Illus. 772 Pages. Cloth, 5.00

Warren. Compend of Dental Pathology and Dental Medicine. Illustrated. Cloth, 1.00; Interleaved, 1.25

DICTIONARIES.

Gould's New Medical Dictionary. Containing the Definition and Pronunciation of all words in Medicine, with many useful Tables etc. ½ Dark Leather, 3.25; ½ Mor., Thumb Index 4.25

Harris' Dictionary of Dentistry. Fifth Edition. Completely revised and brought up to date by Prof. Gorgas. Cloth, 5.00; Leather, 6.00

Cleaveland's Pronouncing Pocket Medical Lexicon. 31st Edition. Giving correct Pronunciation and Definition. Very small pocket size. Cloth, red edges .75; pocket-book style, 1.00

Longley's Pocket Dictionary. The Student's Medical Lexicon, giving Definition and Pronunciation of all Terms used in Medicine, with an Appendix giving Poisons and Their Antidotes, Abbreviations used in Prescriptions, Metric Scale of Doses, etc. 24mo. Cloth, 1.00; pocket-book style, 1.25

☞ *See pages 2 to 5 for list of Students' Manuals.*

EYE.

Hartridge on Refraction. 4th Edition. Cloth, 2.00

Hartridge on the Ophthalmoscope. *Nearly Ready.*

Meyer. Diseases of the Eye. A complete Manual for Students and Physicians. 270 Illustrations and two Colored Plates. 8vo. Cloth, 4.50; Leather, 5.50

Swanzy. Diseases of the Eye and their Treatment. 158 Illustrations. Third Edition. Cloth, 3 00

Fox and Gould. Compend of Diseases of the Eye and Refraction. 2d Ed. Enlarged. 71 Illus. 39 Formulæ. Cloth, 1.00; Interleaved for Notes, 1.25

ELECTRICITY.

Bigelow. Plain Talks on Medical Electricity and Batteries. Illustrated. With a Glossary of Electrical Terms. Cloth, 1.00

Mason's Compend of Medical and Surgical Electricity. With numerous Illustrations. 12mo. Cloth, 1.00

HYGIENE.

Parkes' (Ed. A.) Practical Hygiene. Seventh Edition, enlarged. Illustrated. 8vo. Cloth, 4.50

Parkes' (L. C.) Manual of Hygiene and Public Health. Second Edition. 12mo. Cloth, 2.50

Wilson's Handbook of Hygiene and Sanitary Science. Seventh Edition. Revised and Illustrated. *In Press.*

MATERIA MEDICA AND THERAPEUTICS.

Potter's Compend of Materia Medica, Therapeutics and Prescription Writing. Fifth Edition, revised and improved. *See Page 15.* Cloth, 1.00; Interleaved for Notes, 1.25

Biddle's Materia Medica. Eleventh Edition. By the late John B. Biddle, M.D., Prof. of Materia Medica in Jefferson College, Philadelphia. Revised by Clement Biddle, M.D., and Henry Morris, M.D. 8vo., illustrated. Cloth, 4.25; Leather, 5.00

Potter. Handbook of Materia Medica, Pharmacy and Therapeutics. Including Action of Medicines, Special Therapeutics, Pharmacology, etc. By Saml. O. L. Potter, M.D., M.R.C.P. (Lond.), Professor of the Practice of Medicine in Cooper Medical College, San Francisco. Third Edition. 8vo. Cloth, 4.00; Leather, 5.00

Waring. Therapeutics. With an Index of Diseases and Remedies. 4th Edition. Revised. Cloth, 3.00; Leather, 3.50

☞ *See pages 14 and 15 for list of "Quiz-Compends"*

MEDICAL JURISPRUDENCE.

Reese. A Text-book of Medical Jurisprudence and Toxicology. By John J. Reese, M.D., Professor of Medical Jurisprudence and Toxicology in the Medical Department of the University of Pennsylvania; President of the Medical Jurisprudence Society of Philadelphia; Physician to St. Joseph's Hospital; Corresponding Member of The New York Medico-legal Society. Third Edition. Cloth, 3.00; Leather, 3.50

OBSTETRICS AND GYNÆCOLOGY.

Davis. A Manual of Obstetrics. Colored Plates, and 150 other Illustrations. *Ready in October, 1891.*

Byford. Diseases of Women. The Practice of Medicine and Surgery, as applied to the Diseases and Accidents Incident to Women. By W. H. Byford, A.M., M.D., Professor of Gynæcology in Rush Medical College and of Obstetrics in the Woman's Medical College, etc., and Henry T. Byford, M.D., Surgeon to the Woman's Hospital of Chicago. Fourth Edition. Revised and Enlarged. 306 Illustrations, over 100 of which are original. Octavo. 832 pages. Cloth, 5.00; Leather, 6.00

Cazeaux and Tarnier's Midwifery. With Appendix, by Mundé. The Theory and Practice of Obstetrics; including the Diseases of Pregnancy and Parturition, Obstetrical Operations, etc. Eighth American, from the Eighth French and First Italian Edition. Edited by Robert J. Hess, M.D., Physician to the Northern Dispensary, Philadelphia, with an appendix by Paul F. Mundé, M.D., Professor of Gynæcology at the N. Y. Polyclinic. Illustrated by Chromo-Lithographs, and other Full-page Plates, seven of which are beautifully colored, and numerous Wood Engravings. One Vol., 8vo. Cloth, 5.00; Leather, 6.00

Lewers' Diseases of Women. A Practical Text-Book. 139 Illustrations. Second Edition. Cloth, 2.50

Parvin's Winckel's Diseases of Women. Second Edition. Including a Section on Diseases of the Bladder and Urethra. 150 Illus. Revised. *See page 3.* Cloth, 3.00; Leather, 3.50

Morris. Compend of Gynæcology. Illustrated. Cloth, 1.00

Winckel's Obstetrics. A Text-book on Midwifery, including the Diseases of Childbed. By Dr. F. Winckel, Professor of Gynæcology, and Director of the Royal University Clinic for Women, in Munich. Authorized Translation, by J. Clifton Edgar, M.D., Lecturer on Obstetrics, University Medical College, New York, with nearly 200 handsome illustrations, the majority of which are original. 8vo. Cloth, 6.00; Leather, 7.00

Landis' Compend of Obstetrics. Illustrated. 4th edition, enlarged. Cloth, 1.00; Interleaved for Notes, 1.25

Galabin's Midwifery. By A. Lewis Galabin, M.D., F.R.C.P. 227 Illustrations. *See page 3.* Cloth, 3.00; Leather, 3.50

Rigby's Obstetric Memoranda. 4th Edition. Cloth, .50

☞ *See pages 2 to 5 for list of New Manuals.*

PATHOLOGY. HISTOLOGY. BIOLOGY.

Bowlby. Surgical Pathology and Morbid Anatomy, for Students. 135 Illustrations. 12mo. Cloth, 2.00

Davis' Elementary Biology. Illustrated. Cloth, 4.00

Gilliam's Essentials of Pathology. A Handbook for Students. 47 Illustrations. 12mo. Cloth, 2.00

*** The object of this book is to unfold to the beginner the fundamentals of pathology in a plain, practical way, and by bringing them within easy comprehension to increase his interest in the study of the subject.

Gibbes' Practical Histology and Pathology. Third Edition. Enlarged. 12mo. Cloth, 1.75

Virchow's Post-Mortem Examinations. 3d Ed. Cloth, 1.00

PHYSICAL DIAGNOSIS.

Fenwick. Student's Guide to Physical Diagnosis. 7th Edition. 117 Illustrations. 12mo. Cloth, 2.25

Tyson's Physical Diagnosis. Illustrated.
To be ready, October, 1891.

PHYSIOLOGY.

Yeo's Physiology. Fifth Edition. The most Popular Students' Book. By Gerald F. Yeo, M.D., F.R.C.S., Professor of Physiology in King's College, London. Small Octavo. 758 pages. 321 carefully printed Illustrations. With a Full Glossary and Index. *See Page 3.* Cloth, 3.00; Leather, 3.50

Brubaker's Compend of Physiology. Illustrated. Sixth Edition. Cloth, 1.00; Interleaved for Notes, 1.25

Stirling. Practical Physiology, including Chemical and Experimental Physiology. 142 Illustrations. Cloth, 2.25

Kirke's Physiology. New 12th Ed. Thoroughly Revised and Enlarged. 502 Illustrations. Cloth, 4.00; Leather, 5.00

Landois' Human Physiology. Including Histology and Microscopical Anatomy, and with special reference to Practical Medicine. Third Edition. Translated and Edited by Prof. Stirling. 692 Illustrations. Cloth, 6.50; Leather, 7.50

"With this Text-book at his command, no student could fail in his examination."—*Lancet.*

Sanderson's Physiological Laboratory. Being Practical Exercises for the Student. 350 Illustrations. 8vo. Cloth, 5.00

PRACTICE.

Taylor. Practice of Medicine. A Manual. By Frederick Taylor, M.D., Physician to, and Lecturer on Medicine at, Guy's Hospital, London; Physician to Evelina Hospital for Sick Children, and Examiner in Materia Medica and Pharmaceutical Chemistry, University of London. Cloth, 4.00; Leather, 5.00

☞ *See pages 14 and 15 for list of "Quiz-Compends"*

Practice:—Continued.

Roberts' Practice. New Revised Edition. A Handbook of the Theory and Practice of Medicine. By Frederick T. Roberts, M.D.; M.R.C.P., Professor of Clinical Medicine and Therapeutics in University College Hospital, London. Seventh Edition. Octavo. Cloth, 5.50; Sheep, 6.50

Hughes. Compend of the Practice of Medicine. 4th Edition. Two parts, each, Cloth, 1.00; Interleaved for Notes, 1.25

PART I.—Continued, Eruptive and Periodical Fevers, Diseases of the Stomach, Intestines, Peritoneum, Biliary Passages, Liver, Kidneys, etc., and General Diseases, etc.

PART II.—Diseases of the Respiratory System, Circulatory System and Nervous System; Diseases of the Blood, etc.

Physicians' Edition. Fourth Edition. Including a Section on Skin Diseases. With Index. 1 vol. Full Morocco, Gilt, 2.50

From John A. Robinson, M.D., Assistant to Chair of Clinical Medicine, now Lecturer on Materia Medica, Rush Medical College, Chicago.

"Meets with my hearty approbation as a substitute for the ordinary note books almost universally used by medical students. It is concise, accurate, well arranged and lucid, . . . just the thing for students to use while studying physical diagnosis and the more practical departments of medicine."

PRESCRIPTION BOOKS.

Wythe's Dose and Symptom Book. Containing the Doses and Uses of all the principal Articles of the Materia Medica, etc. Seventeenth Edition. Completely Revised and Rewritten. *Just Ready.* 32mo. Cloth, 1.00; Pocket-book style, 1.25

Pereira's Physician's Prescription Book. Containing Lists of Terms, Phrases, Contractions and Abbreviations used in Prescriptions Explanatory Notes, Grammatical Construction of Prescriptions, etc., etc. By Professor Jonathan Pereira, M.D. Sixteenth Edition. 32mo. Cloth, 1.00; Pocket-book style, 1.25

PHARMACY.

Stewart's Compend of Pharmacy. Based upon Remington's Text-Book of Pharmacy. Third Edition, Revised. With new Tables, Index, Etc. Cloth, 1.00; Interleaved for Notes, 1.25

Robinson. Latin Grammar of Pharmacy and Medicine. By H. D. Robinson, PH.D., Professor of Latin Language and Literature, University of Kansas, Lawrence. With an Introduction by L. E. Sayre, PH.G., Professor of Pharmacy in, and Dean of, the Dept. of Pharmacy, University of Kansas. 12mo. Cloth, 2.00

SKIN DISEASES.

Anderson, (McCall) Skin Diseases. A complete Text-Book, with Colored Plates and numerous Wood Engravings. 8vo. Cloth, 4.50; Leather, 5.50

Van Harlingen on Skin Diseases. A Handbook of the Diseases of the Skin, their Diagnosis and Treatment (arranged alphabetically). By Arthur Van Harlingen, M.D., Clinical Lecturer on Dermatology, Jefferson Medical College; Prof. of Diseases of the Skin in the Philadelphia Polyclinic. 2d Edition. Enlarged. With colored and other plates and illustrations. 12mo. Cloth, 2.50

☞ *See pages 2 to 5 for list of New Manuals.*

SURGERY AND BANDAGING.

Moullin's Surgery, A new Text-Book. 500 Illustrations, 200 of which are original. Cloth, 7.00; Leather, 8.00

Jacobson. Operations in Surgery. A Systematic Handbook for Physicians, Students and Hospital Surgeons. By W. H. A. Jacobson, B.A., Oxon. F.R.C.S. Eng.; Ass't Surgeon Guy's Hospital; Surgeon at Royal Hospital for Children and Women, etc. 199 Illustrations. 1006 pages. 8vo. Cloth. 5.00; Leather, 6.00

Heath's Minor Surgery, and Bandaging. Ninth Edition. 142 Illustrations. 60 Formulæ and Diet Lists. Cloth, 2.00

Horwitz's Compend of Surgery, Minor Surgery and Bandaging, Amputations, Fractures, Dislocations, Surgical Diseases, and the Latest Antiseptic Rules, etc., with Differential Diagnosis and Treatment. By ORVILLE HORWITZ, B.S., M.D., Demonstrator of Surgery, Jefferson Medical College. 4th edition. Enlarged and Rearranged. 136 Illustrations and 84 Formulæ. 12mo. Cloth, 1.00; Interleaved for the addition of Notes, 1.25

*** The new Section on Bandaging and Surgical Dressings, consists of 32 Pages and 41 Illustrations. Every Bandage of any importance is figured. This, with the Section on Ligation of Arteries, forms an ample Text-book for the Surgical Laboratory.

Walsham. Manual of Practical Surgery. For Students and Physicians. By WM. J. WALSHAM, M.D., F.R.C.S., Asst. Surg. to, and Dem. of Practical Surg. in, St. Bartholomew's Hospital, Surgeon to Metropolitan Free Hospital, London. With 236 Engravings. *See Page 2.* Cloth, 3.00; Leather, 3.50

URINE, URINARY ORGANS, ETC.

Holland. The Urine, and Common Poisons and The Milk. Chemical and Microscopical, for Laboratory Use. Illustrated. Fourth Edition. 12mo. Interleaved. Cloth, 1.00

Ralfe. Kidney Diseases and Urinary Derangements. 42 Illustrations. 12mo. 572 pages. Cloth, 2.75

Marshall and Smith. On the Urine. The Chemical Analysis of the Urine. By John Marshall, M.D., Chemical Laboratory, Univ. of Penna; and Prof. E. F. Smith, PH.D. Col. Plates. Cloth, 1.00

Tyson. On the Urine. A Practical Guide to the Examination of Urine. With Colored Plates and Wood Engravings. 7th Ed. Enlarged. 12mo. Cloth, 1.50

Van Nüys, Urine Analysis. Illus. Cloth, 2.00

VENEREAL DISEASES.

Hill and Cooper. Student's Manual of Venereal Diseases, with Formulæ. Fourth Edition. 12mo. Cloth, 1.00

☞ *See pages 14 and 15 for list of ? Quiz-Compends ?*

JUST PUBLISHED.

GOULD'S NEW
MEDICAL DICTIONARY

COMPACT.

CONCISE.

PRACTICAL.

ACCURATE.

COMPREHENSIVE

UP TO DATE.

It contains Tables of the Arteries, Bacilli, Ganglia, Leucomaïnes, Micrococci, Muscles, Nerves, Plexuses, Ptomaïnes, etc., etc., that will be found of great use to the student.

Small octavo, 520 pages, Half-Dark Leather, . $3.25
With Thumb Index, Half Morocco, marbled edges, 4.25

From J. M. DACOSTA, M. D., Professor of Practice and Clinical Medicine, Jefferson Medical College, Philadelphia.

"I find it an excellent work, doing credit to the learning and discrimination of the author."

***** Sample Pages free.**

University of California
SOUTHERN REGIONAL LIBRARY FACILITY
405 Hilgard Avenue, Los Angeles, CA 90024-1388
Return this material to the library
from which it was borrowed.

Biomedical Library

DEC 1 4 1994

RECEIVED

UC SOUTHERN REGIONAL LIBRARY FACILITY
A 000 499 490 1

WQ100
D261m
1891

Davis, Edward P
Manual of practical obstetrics.

MEDICAL SCIENCES LIBRARY
UNIVERSITY OF CALIFORNIA, IRVINE
IRVINE, CALIFORNIA 92664

Uni